NOLOGY DEPT.

THE PAPER INDUSTRY and PAPER WORLD

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AN EDUCATIONAL NEWS MAGAZINE—MARCH, 1943

PLAN POST-WAR NEEDS HERE • • • SO THAT YOU WILL GET IT HERE

PEACE with Victory for UNITED NATIONS

WAR BUSINESS

READJUSTMENT PERIOD

POST-WAR PROSPERITY

Everyone trying to get New Equipment

FIRST COME FIRST SERVED on New D Machinery

LOOKING AHEAD to the time when Victory is Won by the United Nations, we can see paper and board mill management clamoring for new "this" and "that" and new "complete machines." These will be desperately needed to replace equipment, which has become badly worn, inefficient, and obsolete, due to the war-time ban on the usual replacements, and because post-war demands of competition will be too much for "exhausted" machinery. . . . You can give yourself a Priority Rating of AAA on Delivery after the war, by letting our engineers make all the plans NOW, for the machinery that you consider will be necessary THEN. These plans can then be put in our shop as soon as Peace is declared. Delivery of your new machinery will thus be months ahead of those who fail to PLAN NOW.

DOWNINGTOWN MFG. CO.
Downingtown • Pennsylvania

PLAN NOW!

★ PLAN NOW • GET A PRIORITY RATING OF D AAA ON POST-WAR DELIVERY ★ ★

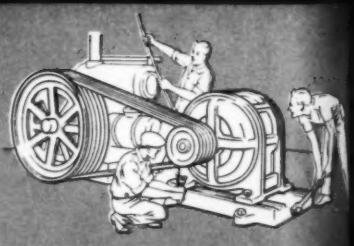
ROCKWOOD *automatic belt tightening* MOTOR BASES

MAC SIM BAR INSTALLS THEM

Mac Sim Bar Paper Company has a big two paper machine board mill at Otsego, Mich. They have 20 beaters and turn out 400,000 lb. in 24 hours. In 1935 they installed their first Rockwood Drives, liked them and have since installed a number. Picture shows 50 h.p. motor flat belt drive to 1,200 lb. Hollander type beater.

This is another successful paper mill where the engineers have placed their seal of approval on *automatic belt tightening* Rockwood pivoted motor bases. Improved performance and more uniform speeds of the driven machines have proven their worth. They have observed, too, the increased belt life and savings in power due to almost total elimination of belt slip.

Automatic belt tightening is an important improvement for electric motor belt drives—either V or flat belts. Manual belt tightening is more expensive—less dependable and far less efficient.



STOP DOING THIS

It is no longer good practice to move the motor back to tighten the belts. Such relief from belt slip is only temporary since the belts are usually tightened more than is necessary, they wear out just that much faster. THE MODERN PRACTICE is to use the Rockwood pivoted motor base AUTOMATICALLY keep the belts at just the right tightness—regardless of belt stretch or changes in load.

HOW ABOUT CHECKING YOUR ELECTRIC MOTOR BELT DRIVES? Send us needed information on the more important ones and let us submit recommendations. KEEP YOUR DRIVES UP TO DATE. Install Rockwood automatic belt tightening motor bases for either flat or V-belt drives.

ROCKWOOD MANUFACTURING CO., INDIANAPOLIS, IN

WE'VE BEEN IN TRAINING SINCE 1858!

Craftsmen can't be trained by sprints. Craftsmanship is a *marathon*. From father to son, since 1858, Beloit skills have been passed along and carefully developed. That's why the men in the Beloit shop, today engaged in an all-out effort, can work together like a team, march together like West Pointers. Beloit craftsmen aren't wearing tin hats, but the job they're doing on the factory front is as essential as military operations. You won't find a more determined shoulder-to-shoulder group of "fighters" anywhere in the U.S.A.!

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In producing an infinite variety of paper and paper products for both the military and civilian needs of the Nation, the paper industry uses Texaco.

In pulp and paper mills everywhere, *Texaco Ursa Oil* in the circulating systems of dryers and calenders keeps bearings cool. Resisting breakdown and sludging, *Texaco Ursa* assures oil lines clear, with clean oil to each and every bearing.

So effective have Texaco lubricants proved in increasing output that they are definitely preferred in many important fields, a few of which are listed in the panel.

These Texaco users enjoy many benefits that can be yours. A Texaco Lubrication Engineer will gladly cooperate ... just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write to:

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TEXACO

TEXACO Lubricants

FOR THE PAPER INDUSTRY

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY.

THE CHEMICAL COMPOUND THAT OUTDID

Rip Van Winkle

• Commercially, *sodium chlorite* was asleep for 100 years. It was not until 1941 that it came into its own – when it was first produced in commercial quantities at Mathieson's new chlorite plant at Niagara Falls. Fourteen years of intensive research and practical experimentation by the Mathieson technical staff had preceded the actual construction and operation of the plant.

Long known to chemists by the formula $NaClO_2$, sodium chlorite has unusual oxidizing powers which make it an invaluable bleaching and processing agent. Today sodium chlorite is widely used in the paper and textile industries. It has successfully demonstrated its ability to bleach paper pulp and textiles to high whites without loss in tensile strength – a result that no other known processing agent has been able to achieve. Non-hygroscopic and readily soluble in water, sodium chlorite is highly stable both in solution and in solid form . . . can be heated to 150 degrees C. without decomposition.

Every day this exclusive Mathieson product is finding new applications in American industry – at a time when progress and production are as vital to victory as all-out offensives on the fighting fronts.

DO YOU KNOW THESE FOUR SODIUM CHLORITE PRODUCTS?

- *Textone* for textiles
- *C2* for paper pulp processing
- *Sodium Chlorite Technical* for general commercial oxidation and processing
- And, of course, the *pure analytical grade* used as a laboratory reagent

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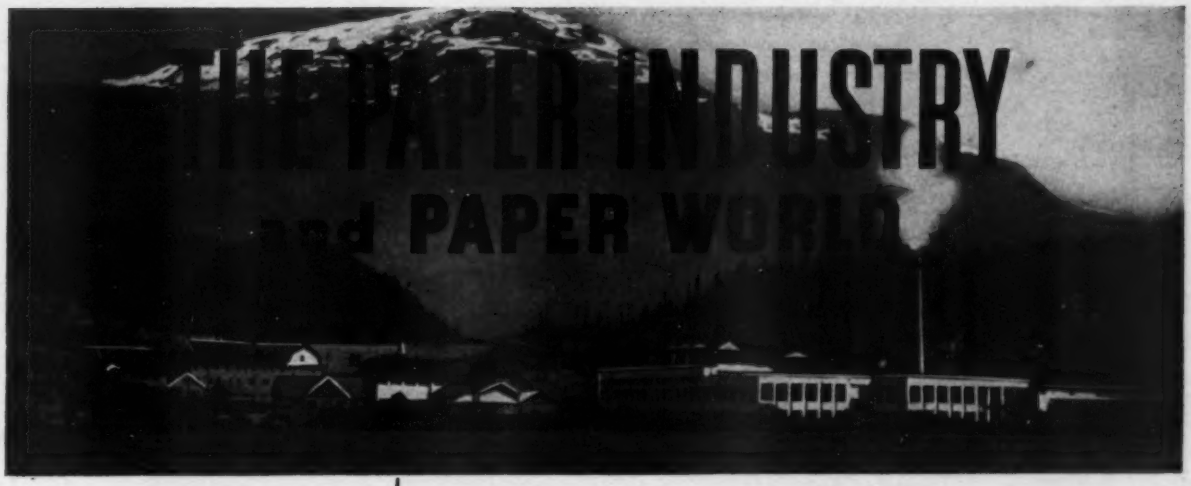

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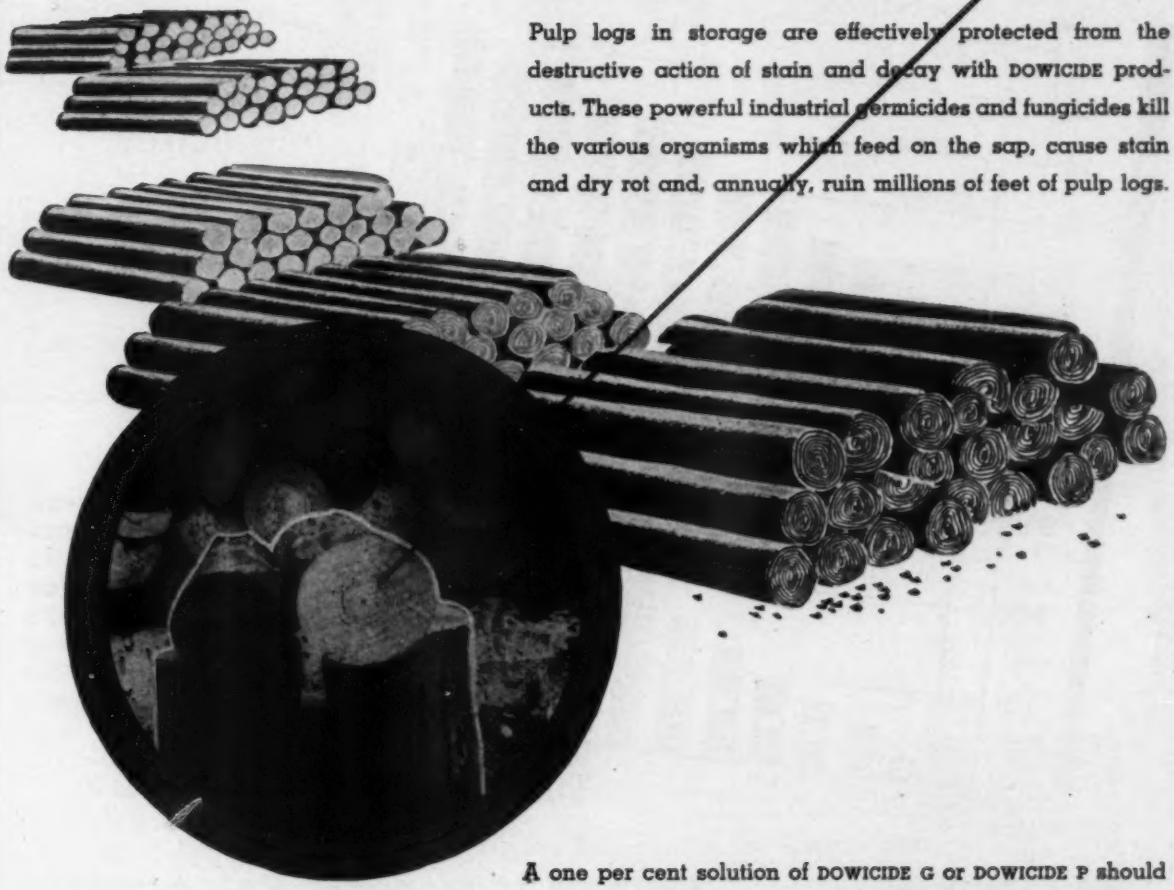
How to safeguard valuable pulp logs in storage



Pulp logs in storage are effectively protected from the destructive action of stain and decay with DOWICIDE products. These powerful industrial germicides and fungicides kill the various organisms which feed on the sap, cause stain and dry rot and, annually, ruin millions of feet of pulp logs.

Pulp log at left untreated—log at right protected by dipping in 1% Dowicide solution.

A one per cent solution of DOWICIDE G or DOWICIDE P should be applied as soon as possible after cutting, preferably within 24 hours. Treating can be done in the woods or at the time of unloading the logs at the banking location.

For complete information on how to safeguard valuable pulp logs in storage, write to Dow requesting DOWICIDE bulletin No. 42.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

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Other Protective Services Provided by Dowicide:

For the preservation of lap and pulp stock—DOWICIDE F or G. For longer felt life—DOWICIDE G. For the preparation of mold-resistant paper products—DOWICIDE A, B and G. For the prevention of decay and termite attack—DOWICIDE G. For controlling slime conditions—various combinations of DOWICIDE with other materials. For reducing maintenance costs—DOWICIDE 7, preserves structural timbers; DOWICIDE 6, protects paint film from mold growths.

DOWICIDE

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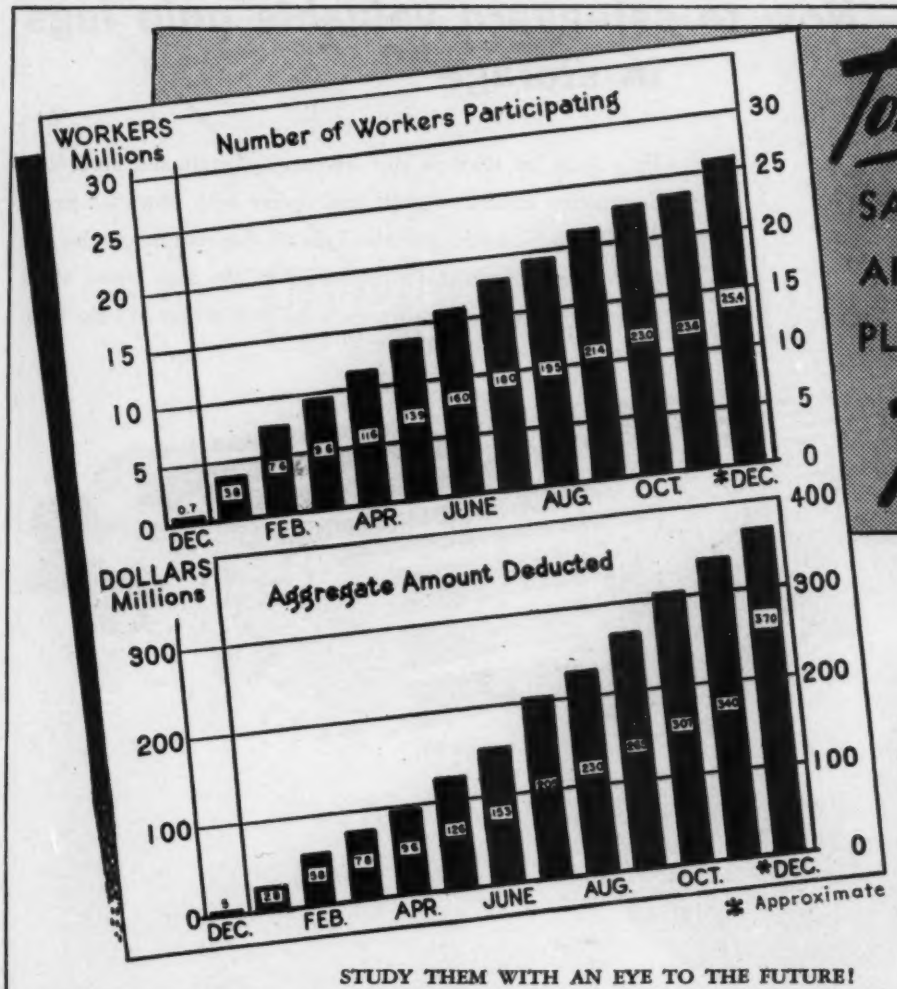
TO INDUSTRY AND VICTORY



Tomorrow's SALES CURVES ARE BEING PLOTTED . . . Today

THESE CHARTS SHOW ESTIMATED PARTICIPATION IN PAYROLL SAVINGS PLANS FOR WAR SAVINGS BONDS (*Members of Armed Forces Included Starting August 1942*)

STUDY THEM WITH AN EYE TO THE FUTURE!

There is more to these charts than meets the eye. Not seen, but clearly projected into the future, is the sales curve of tomorrow. Here is the thrilling story of over 25,000,000 American workers who are today voluntarily saving close to FOUR AND A HALF BILLION DOLLARS per year in War Bonds through the Payroll Savings Plan.

Think what this money will buy in the way of guns and tanks and planes for Victory today—*and mountains of brand new consumer goods tomorrow.* Remember, too, that War Bond money grows in value every year it is saved, until at maturity it returns $4 for every $3 invested!

Here indeed is a solid foundation for the peace-time business that will follow victory. At the same time, it is a real tribute to the voluntary American way of meeting emergencies that has seen us through every crisis in our history.

But there is still more to be done. As our armed forces continue to press the attack in all quarters of the globe, as war costs mount, so must the record of our savings keep pace.

Clearly, on charts like these, tomorrow's Victory —*and tomorrow's sales curves*—are being plotted today by 50,000,000 Americans who now hold WAR BONDS.

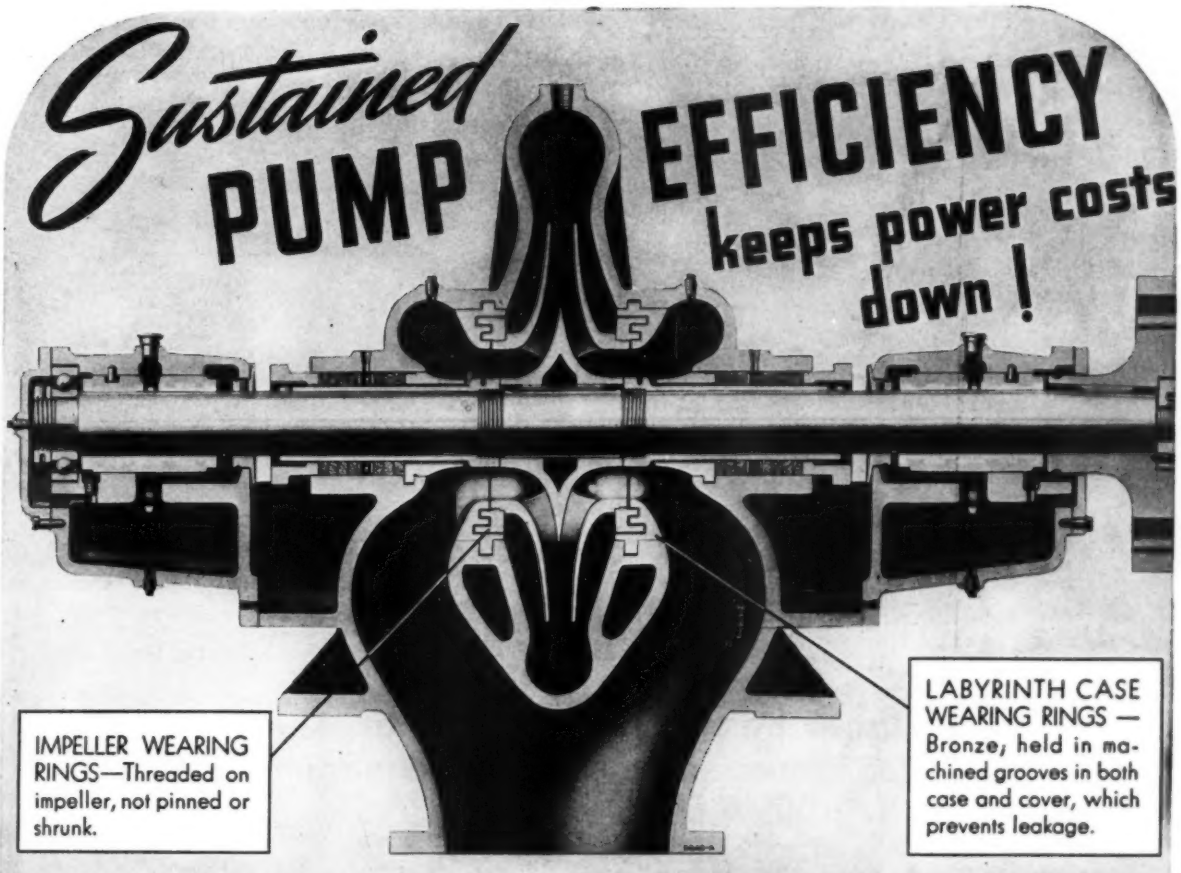
EVERYBODY EVERY PAYDAY AT LEAST 10%

Save with

War Savings Bonds

This space is a contribution to America's all-out war effort by
THE PAPER INDUSTRY and PAPER WORLD

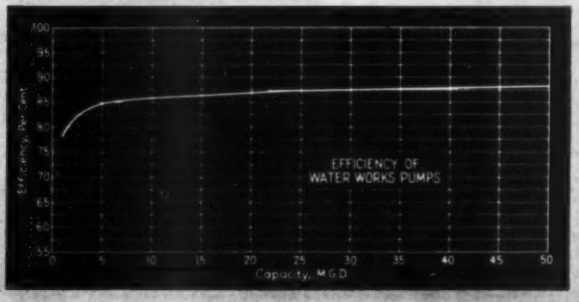
Sustained PUMP EFFICIENCY keeps power costs down!


IMPELLER WEARING RINGS—Threaded on impeller, not pinned or shrunk.
LABYRINTH CASE WEARING RINGS — Bronze, held in machined grooves in both case and cover, which prevents leakage.

Initial high pump efficiency is sometimes obtained by the use of excessively close clearances between wearing rings, but, attained in this way, it is not long maintained, particularly where flat rings are relied upon.

DE LAVAL LABYRINTH WEARING RINGS are distinct because, without resort to close clearances, they make possible high pump efficiency, which is maintained over a long interval, as demonstrated, for instance, by two 25 m. g. d. De Laval pumps in the Shawmont Station, Philadelphia.

Unit No. 4 in the acceptance test on January 22, 1927, showed a wire-to-water efficiency of 82.7 per cent and, when tested again on January 20, 1933, an efficiency of 83.9 per cent.



Efficiencies attainable with various capacities at heads between 125 and 225 ft.

Similarly, Unit No. 5 on the acceptance test on March 3, 1927 showed 83.3 per cent efficiency and, when tested again on January 31, 1933, it showed 83.9 per cent.

•

For further particulars and other instances, ask for Publication P-3225.

DE LAVAL STEAM TURBINE CO. . . TRENTON, N. J.

PAPER

Is Vital to

VICTORY

Paper has recorded the progress of man since it was first made in 105 A.D.

Paper has been the battlefield whereon "26 soldiers of lead have conquered the world" in the conquest for world-wide communications.

- Now that a MONSTER has reared its ugly head to destroy the peace of the Earth—

Paper Again Fights—not only from the printed page, but it is now serving on the battlefront in actual warfare, and every day it is found substituting somewhere for critical war materials.

PAPER IS IN THE WAR!

TRADE WINDS

CONTROLLED MATERIALS PLAN
and its effect on the Pulp and Paper Industry

▶▶▶ DURING PAPER WEEK in New York City, one event of outstanding interest was an open meeting held Wednesday, February 17, at the Waldorf-Astoria. This gathering was known as a "Priority Clinic," the purpose of which was to discuss CMP Regulation No. 5. After March 31, CMP No. 5 will supersede P-100 (Cf. Section 2, THE PAPER INDUSTRY AND PAPER WORLD, May, 1942), which, it is claimed, has outlived its usefulness.

The American Paper and Pulp Association has just released a copy of the remarks made by J. L. Ritchie, chief of the Operations Section of the Pulp and Paper Branch of the WPB at the Priorities Clinic, in which the purposes of the Controlled Materials Plan are set forth, and the plan itself clearly defined.

Mr. Ritchie's remarks introducing the plan are reproduced herewith:

Introduction

The Controlled Materials Plan has two primary functions:

1) To direct the flow of steel, copper and aluminum into essential channels.

2) To schedule the production of products containing these controlled materials.

The primary pulp and paper industry falls within the scope of the first function since the industry *does* consume controlled materials. The primary industry is not within the scope of the second function, however, since none of its products contain controlled materials.

For purposes of the primary pulp and paper industry, therefore, we can limit our consideration of the Controlled Materials Plan to a consideration of its function as a vehicle for the distribution of controlled materials.

Controlled materials are distributed for three purposes:

1) For use as a production material.

2) For use for maintenance or repair or as an operating supply.

3) For use in construction.

The primary pulp and paper industry uses no metal for production. Hence, the regulations and forms designed for use by industries engaged in the production of products fabricated from controlled materials have no application to pulp and paper. CMP-4A and CMP-4B fall within this category. They are designed solely for use by applicants whose products are fabricated in whole or in part from controlled materials. Pulp and Paper are neither Class A nor Class B products since they contain *no* controlled materials. Therefore, the distinction between Class A and Class B products is of no importance to the pulp or paper mill. Hence, pulp or paper mills that have received CMP-4A or CMP-4B forms with requests to file should disregard such forms and requests. These are intended only for the use of manufacturers of metal-bearing products.

By process of elimination, therefore, the primary pulp and paper industry is interested in the Controlled Materials Plan as a device for the distribution of critical metals for two specific purposes:

1) For use in maintenance and repair or as an operating supply.

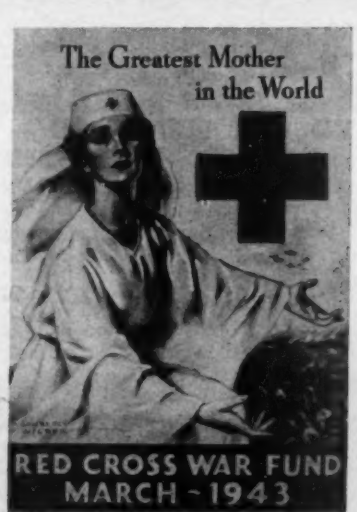
2) For use in new construction.

. . . . . .

The Plan

Mr. Ritchie's outline of the plan included the following subjects: Construction and Facilities; Maintenance, Repair and Operating Supplies; Inventories; Preference Ratings Under CMP (1—Effect on Controlled Materials; 2—Effect on Materials other than Controlled Materials); and Effect of Priorities Regulation 11-A. In concluding his remarks, he stated . . . . .

"In conclusion, it would seem that the operation of the pulp and paper industry under the priorities system should be materially simplified as a result of these new CMP regulations. The treatment of Maintenance, Repair and Operating Supplies on a blanket basis should afford the pulp and paper industry far greater flexibility than the industry has enjoyed heretofore, and at the same time eliminates most of the troublesome red tape that has attended the procurement of materials in the past."



◆

CANADA SETS UP STABILIZATION NEWSPRINT POOL

Figures on the Canadian Newsprint Stabilization pool have been published in accordance with government regulations. Indications are that the figures will no longer be made public during wartime.

These regulations provide that manufacturers of newsprint must place their manufacturing facilities at the disposal of the Government. It also stipulates specified payments to be made into the compensation fund by the manufacturers.

For September, 1942, to December, 1942, the amounts are:

	Pay In
Abitibi Power & Paper Co., Ltd.	$375,126
Great Lakes Paper Co., Ltd.	231,301
Spruce Falls Power & Paper Co., Ltd.	182,593
Canadian International Paper Co.	190,252

Ontario-Minnesota Pulp & Paper Co., Ltd.	146,992
James Maclaren Co., Ltd.	132,673
Quebec North Shore Paper Co.	121,657
Mersey Paper Co., Ltd.	58,763
St. Lawrence Paper Mills Co., Ltd.	53,158
Anglo-Canadian Pulp & Paper Mills, Ltd.	16,670
Donnacona Paper Co., Ltd.	8,428
St. Raymond Paper, Ltd.	5,982
Donohue Bros., Ltd.	3,755
Provincial Paper, Ltd.	3,008
E. B. Eddy Co., Ltd.	194

Take Out

Ontario Paper Co., Ltd.	$381,518
Consolidated Paper Corp., Ltd.	257,326
Price Bros. & Co., Ltd.	211,479
Lake St. John Power & Paper Co., Ltd.	172,596
Powell River Co., Ltd.	106,474
Pacific Mills, Ltd.	61,560
Beaver Wood Fibre Co., Ltd.	44,600
Brompton Pulp & Paper Co., Ltd.	3,036
Bathurst Power & Paper Co., Ltd.	2,394
J. R. Booth, Ltd.	553

These "Pay In" and "Take Out" figures are compiled by each newsprint company in Canada being given a definite percentage rating of the total business available. If the company produces under that figure due to an inability to produce because of power withdrawal, material, or labor shortage, etc., then it is entitled to draw out of the "pool" the profit it ordinarily would have made on the tonnage of production affected. Similarly, if a mill produces more than its allotment of the available business, then it must put into the pool all profit above its normal production.

◆

PULPWOOD PLANT IS INSTALLED BY SHINGLE COMPANY

A pulpwood plant has been installed in the Lewis Shingle Company shingle mill in Wheeler, Oregon. Logs will be trucked from the Hawley Pulp and Paper Company's 18,000 acres of timber surrounding Wheeler to the mill where they will be converted into pulpwood and shipped by rail to Oregon City.

With an added crew of 16 men, the shingle mill will operate five machines the first shift and cut pulpwood the second shift.

◆

CAN. NEWSPRINT MILLS FORECAST WOOD SUPPLY

With the pulpwood cutting season nearly completed, three of the largest Canadian newsprint manufacturers have advised their customers that there is sufficient wood available to permit Canada to supply newsprint at the present rate of consumption until June, 1944. This indicated a substantial improvement in the situation in contrast with estimates made in December of the amount of pulpwood available in Canada, chief supplier of the United States.

One of the larger Canadian newsprint makers said this conclusion had been reached in consultation with other large manufacturers and their wood managers, and was based on new figures not available earlier. The figures indicated a surplus of 600,000 cords as of June, 1944, not counting the wood to be brought out from the autumn and winter cutting season of 1943-44.

◆

U. S. PULP MILLS TO GET HEMLOCK FROM B. COLUMBIA

Canada has modified her log export policy with regard to hemlock and the Puget Sound Mills in Washington will receive shipments from British Columbia.

It is expected that as high as 5,000,000 feet a month of hemlock will be shipped to the United States pulp mills. British Columbia mills, which normally consume 37 million tons of pulpwood per month, will be affected by the shipments, but A. H. Williamson, Timber Controller for the Dominion, has ruled that raw materials such as pulp logs are to be divided between the United Nations in accordance with the tone of the Hyde Park agreement. Douglas fir logs will remain on embargo lists.

British Columbia pulp mills have been operating at 80 per cent or more of capacity while Puget Sound mills were averaging around 60 per cent, Mr. Williamson said.

◆

▶▶▶ A MINUTE MAN FLAG has been presented to employees of Oswego Falls-Sealright Corporation, Fulton, New York. The ceremony was held February 9, in the Sealright container building from 1:45 to 2:15 p. m. All plant operations were stopped during the half hour to permit employees to attend. Paul H. Conway, of Syracuse, represented the Treasury Department in making the award, and John Lincoln, president of the A. F. of L. local, received the flag in behalf of the employees.

◆

IMPORTANCE OF WOOD IN WARTIME

The importance of wood during this time of War and the ever-increasing need of growing and cutting of lumber according to good forestry practices were stressed recently by Professor Raymond J. Hoyle of the New York State College of Forestry, Syracuse University, Syracuse, New York.

"It is a patriotic duty for the people of the United States to be forest-con-

Washington News

SECOND 10% CUT IN PAPER USE DEFERRED

A press release from the WPB dated March 4, states that the Board has announced it will impose no further cut on the use of print paper for newspapers, magazines, book and commercial printing until July. This, of course, refers to the second 10 per cent cut recently proposed to become effective the second quarter. The first ten per cent cut was effective January 1.

▶▶▶ A JOINT ANNOUNCEMENT from the governments of the United States and Canada has raised the ceiling price on newsprint $4 per ton. This increase became effective March 1. Simultaneously with the announcement, the Canadian International Paper Company announced it was increasing its price of newsprint to $54 per ton, New York.

▶▶▶ JOHN R. KIMBERLY has resigned from the War Production Board to return to private work with the Kimberly-Clark Corporation. His resignation is understood to have been at his own desire to return to private life, and not to have been part of the recent sensational shake-up in the higher brackets of the War Production Board.

▶▶▶ EFFECTIVE FEBRUARY 15, the minimum wage rate in the paper box industry was raised to 40 cents an hour. This order affects all hosiery box factories and all hosiery, underwear, or other textile products plants which operate their own boxmaking departments. Previous to this order the minimum wage rate was 36 cents an hour.

NO CURTAILMENT OF STOCK HERE

These days you can thank your lucky stars if you have a well-planned Bird Save-All closed white water system . . . Built to do this key conservation job day in and day out with a minimum of frills and fuss, Bird Save-Alls are making a truly important contribution to the industry during these critical times . . . Let us know if you need any help to keep your Save-All system doing the best possible job for you.

BIRD MACHINE COMPANY

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servation minded because the forest is one of our front lines. The importance of forests and their products in the present global War is very great and now is attracting national attention," he said. He pointed out that wood is being adapted to hundreds of war purposes.

"Interesting," said Professor Hoyle, "is the story of wood in warfare. Tent stakes and poles and the framework of army cots are keeping factories at top speed. Skiis of high-quality wood for training and equipping troops are an important war item. We are exporting to our allies a tremendous quantity of finished and semi-finished lumber. Now we are reading of bedsprings made of wood. Some of our largest battleships require 500,000 board feet of lumber. The fastest and the largest airplane is made of wood."

◆

FINANCIAL

▶▶▶ PAPER MILL SECURITIES followed the lead of the securities markets which forged upward during the month, reaching new highs for the past two years, and sales were in volumes far larger than sales have been recorded since the opening of the War in Europe.

Albemarle Paper Manufacturing Company—For the nine months ending December 31, the company's net loss was $103,801 as against a profit of $350,389 for the same period in 1941.

American Writing Paper Corporation—Net profit for the year ending December 31, 1942, was $233,936 as compared with a net profit of $353,494 in 1941.

Container Corporation of America—Consolidated net profit for 1942 was $2,401,748 compared with $2,327,177 for 1941.

Crystal Tissue Company—Net income for 1942 was $104,903 as against $152,264 for 1941.

Oxford Paper Company—Net profit for the year ending December 31, 1942, was $777,336, comparable to $1,056,841 for 1941.

Paraffine Companies—Net profit for three months ending December 31, was $419,211 as against $608,116 for the comparable period in 1941.

Rhinelander Paper Company—Net income for 1942 to September 30 was $488,268 as against $524,148 for the first nine months of 1941.

St. Helens Pulp and Paper Company—Net profit for the year ending December 31, 1942, was $396,127 as against a net profit of $481,651 for 1941.

Sutherland Paper Company—Net profit for 1942 was $737,917 as against $818,055 for 1941.

United Paperboard Company—Net profit for six months ending November 28 was $15,622 compared with $192,561 for the comparable period in 1941.

New York Stock Exchange—Stocks

	Closing Prices Feb. 25, 1943	Jan. 25, 1943
A. P. W. Paper Co.	2⅛	*1⅜–1¼
Celotex	10¾	9⅞
Same Preferred	87½	81½
Certain-teed	4⅛	3⅜
Same Preferred	40¼	38½
Champion P. & F. Co.	18⅜	18⅜
Same Preferred	104	100
Container Corp.	21⅛	18¼
Cont. Diamond	10¾	8½
Crown Zellerbach	13⅜	12
Same Preferred	90	85
Dixie Vortex	12	10¾
Same "A"	*38½–39¼	*39–39½
Robert Gair	3¾	2
Same Preferred	12¾	10
Gaylord Container	13⅜	*10½–10¾
Same Preferred	*51–54	*51–54
International Paper	10½	9¾
Same Preferred	56⅞	54
Kimberly-Clark	29¼	26¼
MacAndrews & Forbes	*24⅛–24½	*21½–22
Mead Corp.	8½	7¼
Same Preferred	87	71¼
Masonite	36¼	32¾
Paraffine Cos.	39⅜	*35–36
Same Preferred	*97¼–104	100
Rayonier	12	12½
Same Preferred	*28⅞–29	*28½–29¼
Scott Paper	*41–42	39⅞
Same 4½% Pfd.	*113–114	*113½–114½
Same 4% Pfd.	*111–114	*107¾–108½
Sutherland Paper	26¾	27⅝
Union Bag & Paper	11½	9¼
U. S. Gypsum	65	61½
Same Preferred	*173½–176	*172–175

New York Stock Exchange—Bonds

Abitibi 5%	.....	.....
Celotex 4½%	101⅛	100¼
Certain-teed 5½%	98½	95⅜
Champion P. & F. Co. 4¾%	.....	.....
International Paper 5%	.....	.....
Same 6%	.....	.....

New York Curb Exchange—Stocks

Am. Boxboard	6	.....
Great Northern	31	31
Hummel-Ross	4	.....
St. Regis	2⅞	1⅞
Taggart	3⅞	.....
United Wall Paper	2⅜	1⅜

*Closing Bid and Asked Prices.

◆

FLATHEAD PULP & PAPER CO. BUYS LUMBER COMPANY

A recent announcement states that the Flathead Pulp and Paper Company, of Missoula, Montana, has acquired the mill of the Dewey Lumber Company at Polson, Montana.

It will be recalled that in January, 1942, the Flathead Company was incorporated and proposed to build a pulp and paper mill at Polson. The Dewey Company has been in operation in Polson since 1910.

"STRATHMOREAN" MARKS COMPANY'S 50TH ANNIVERSARY

In 1942, the Strathmore Paper Company, with mills at West Springfield and Woronoco, Massachusetts, marked the fiftieth anniversary of its founding by Horace A. Moses. Mr. Moses observed his eightieth birthday on April 21, 1942. He is active, and in good health, and is president and general manager of the company.

The company had arranged to issue an anniversary number of its magazine, the *Strathmorean*, to mark its half century. The book was partially completed when the printer who had the job was compelled to convert practically his entire capacity to essential war printing for the Government. By the time the work could be completed, the anniversary year had passed. However, anyone who is privileged to read this fascinating story of Strathmore and to examine the deluxe edition of the *Strathmorean*, just now released, would never guess there had been any interruption.

This fiftieth anniversary edition is a 109-page pictorial book, bound with stiff cover, gold stamped. It is printed on all-rag book paper, made by Strathmore, and it is so well done and many of the pictures so colorful, that it would be interesting to a reader with no knowledge of the activities of the company. Great care has been exercised to give recognition to the employees and their activities. Charles E. Higgins is editor of the *Strathmorean*.

◆

ALGONQUIN MILL TO CLOSE DOWN

Frank A. Augsbury, president of the Algonquin Paper Corporation, Ogdensburg, New York, has announced the closing of the Algonquin mill on or about March 7. He said the closing was temporary, due entirely to abnormal conditions brought about by the War, and that the mill would be reopened as soon as conditions will permit.

"I realize that Algonquin is Ogdensburg's largest industry and has been the backbone of this city since it was opened September 1, 1923, and I am as anxious to see it reopen as anyone," he said.

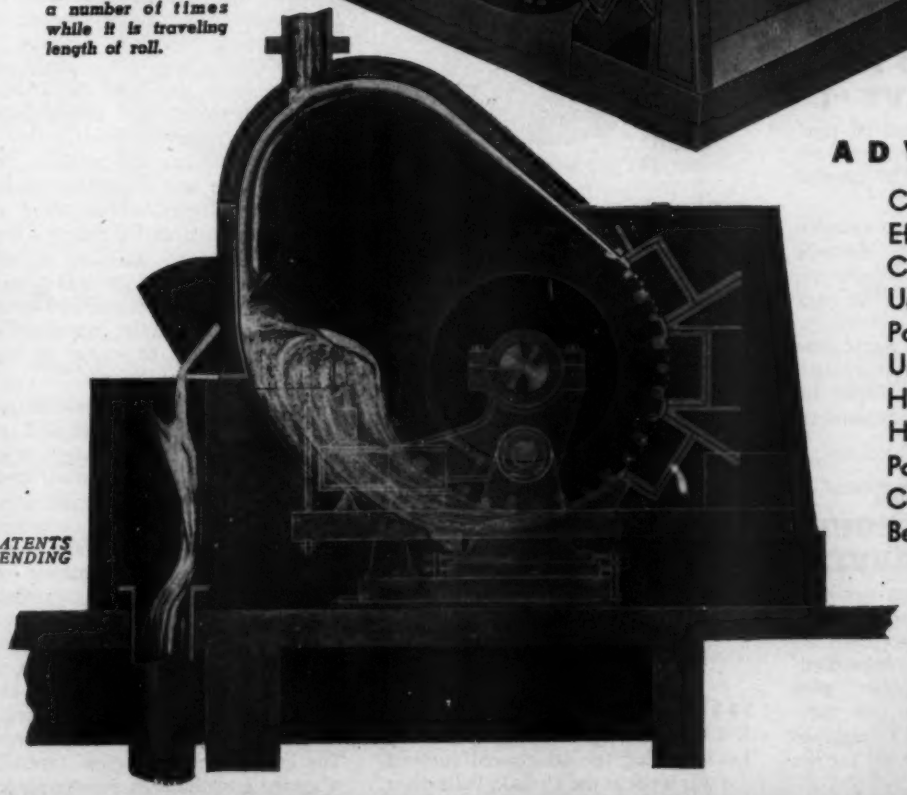
According to Mr. Augsbury, several factors have brought about the shutdown of the mill. The production schedule has been reduced from 4,000 to 2,500 tons a month by the WPB, and costs of manufacture have steadily increased, including taxes, wages, and all materials.

"Another factor has been the increasing difficulty of obtaining pulp-

The ROLL-O-FINER

Handles raw and free stocks at high consistencies with positive, controllable roll pressure. Highly efficient fibre treatment. Equipped with stone or steel bars. Basalt Lava stone treatment ideal for high strength development, without cutting. Produces superior stock from kraft, sulphite, and ground wood screenings. Roll designed to prevent stock submergence, with resultant low H.P. Built and operating in U. S. Many successful installations. Ask for Roll-O-Finer Bulletin.

Diagram of spiral travel of stock from feed to outlet. Stock cycles around the roll a number of times while it is traveling length of roll.



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wood from our own holdings on the Gaspe and from other sources," Mr. Augsbury said. "We have not been able to get enough pulpwood to operate at our regular production level of 4,000 tons a month, and could not make that much paper even if we got the pulpwood under the WPB restriction order."

At present there are 200 men employed in the mill. Normally, 300 or more men are employed, but the draft, enlistments, and loss of men to other plants paying war plant wages have cut down the figure.

"This is not enough men to operate the mill, and it can't operate and break even unless it is going at capacity," Mr. Augsbury stated. "A combination of all these factors: manpower, wood pulp supply, price ceiling, and restricted production have made the move inevitable at the present time."

Mr. Augsbury stated that the sulphite mill, employing about 75 men, will continue to operate at capacity. He said that there is sufficient wood on hand to maintain full production in the sulphite mill until navigation opens in the spring and more pulpwood can be brought in.

◆

MASONITE CORP. IS AWARDED THE ARMY-NAVY "E"

A large number of industrial companies all over the country have been awarded the Army-Navy "E" coveted pennant for excellence.

Few paper mills have been awarded this distinction, but the Masonite Corporation, of Laurel, Mississippi, has just received the "E" (See page 1274).

The first paper mill to receive the Army-Navy "E" was the Hammermill Paper Company (Cf. The Paper Industry and Paper World, September, 1942, p. 608).

◆

PAIRPOINT MILL BOUGHT BY GROUP HEADED BY BABBITT

Isaac N. Babbitt and associates have purchased all of the remaining fixed assets, trademarks, and goodwill of the Pairpoint Corporation, New Bedford, Massachusetts, together with land, buildings, machinery, raw material, trucks, apparatus, and furnishings now contained in the property, for the sum of $175,000.

The price has been approved by the stockholders of the Pairpoint Corporation, and Seabury Stanton, president of Pairpoint, and the company's vice president were given full authority to complete the sale.

In connection with the transaction, Mr. Babbitt announced that operation of the paper mill would be continued, with substantially the same personnel as is now employed in the plant. He said that the rest of the property would be developed with various diversified industrial activities not now located in New Bedford. Mr. Babbitt also said that as yet he was unable to disclose the identity of his associates.

◆

NEW PAPERBOARD GARBAGE CAN

A paperboard garbage can, developed by Container Corporation of America, and manufactured by the Arvey Corporation, both of Chicago, is the latest outgrowth of a search for

containers to replace those made from critical materials. The containers are now on the market, sold under the name "Utility Cans" through the regular channels of distribution.

The Container Corporation found that best results were obtained when the containers were completely finished by the manufacturer and shipped in a ready-to-use form. As this required special equipment and production lines in Container's fabricating plants, difficult to attain under war conditions, the Arvey Corporation, already well equipped for the job, was licensed by Container Corporation to produce the cans. A special asphalt-treated paperboard supplied by the Consolidated Paper Company of Munroe, Michigan, is used in their manufacture.

◆

▶▶▶ A CHANGE IN ENGINEERING PLANS by the Army and Navy has cancelled the anticipated contract for war work at the Hudson Falls plant of the Union Bag and Paper Corporation. The company has halted development work in connection with this war contract and is now investigating other work which might be done at the Hudson Falls plant.

U. S. CHAMBER TO STUDY ECONOMIC POSTWAR PROBLEMS

Under a tentative program looking toward the development of plans to assure full employment after the War, a committee on economic policy of the Chamber of Commerce of the United States was announced February 26 to make an over-all study of postwar problems based upon a preliminary "balance sheet" of favorable and unfavorable conditions that can be expected to prevail after the War. Edgar V. O'Daniel, vice president of the American Cyanamid Company, is chairman; J. Cameron Thomson, vice chairman; and Dr. Emerson P. Schmidt, on leave from his duties as professor of economics at the University of Minnesota, is economist and secretary.

The aims and purposes of the committee are:

1) To identify, analyze, report, and get action upon economic problems, nationwide and international in their postwar effect.

2) To promote the analysis of local problems and conditions by local organizations and develop means of accomplishing desirable objectives.

3) To encourage the analysis and study by trade and industrial associations of problems and opportunities within their respective fields.

4) To stimulate the analysis and study by state and regional organizations of problems within their respective jurisdictions for future action.

5) To urge local, state, and regional bodies to analyze and get action upon national and international economic policies that bear on the attainment of local and national objectives of high production and employment.

A number of other committees and departments of the Chamber of Commerce of the United States are engaged in activities bearing on postwar problems. Its department of construction and civic development is collaborating with business and governmental groups in the development of a postwar construction program and also is making an intensive study of urban problems. The field division has made a survey of estimated consumer demand in the immediate postwar period and is analyzing the extent of the reconversion problem faced by American business. The committee on foreign commerce is studying methods of promoting foreign trade. A special committee on social security is inquiring into postwar needs in that field, while the commercial organization department is promoting formation of local committees to consider postwar problems.

Boom in war babies!

AMERICA's industrial birth rate is zooming, too. Spurred by war, such wonder children as synthetic rubber, plastics, dehydrated foods, air freighters, have emerged from blueprints and test tubes to reality.

The influence of victory's offspring is far reaching, fast growing. It means new methods and new processes in many different fields. To manufacturers meeting these changes, the technical assistance of the Wyandotte Chemicals Corporation can be of great value.

Wyandotte men are working with more than fifty different industries —expediting the handling of alkalies in textiles, caustic in explosives, chlorine in plastics. They are abreast of developments which . . . once seemingly remote . . . may now have a direct bearing on the "duration" uses and post-war prospects of your own products.

Whether your product is a "war baby" or is long established, the broad experience and research background of Wyandotte experts are freely offered. There is no obligation for their assistance.

• *Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.*

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NO MONOPOLY OF PULPWOOD FOUND IN SO. CAROLINA

Although noting that "considerably higher prices are paid in Maryland, Pennsylvania, and West Virginia" than in South Carolina, a pulpwood investigating committee reported on February 24 that it failed to find "monopolistic tendencies in the purchase of trees for pulp."

The committee, headed by Senator George Warren of Hampton, was created by the 1941 South Carolina Legislature, and submitted to the current state legislative session a 40-page printed report outlining the results of its two-year investigation and recommending procedure in controlling the pulpwood industry in South Carolina.

◆

600 HAMMERMILL EMPLOYEES HAVE 20 YRS. SERVICE

Counting the employees who will celebrate their 20th anniversary this year, 600 men and women have stayed at Hammermill Paper Company, Erie, Pennsylvania, 20 years or over, and their names may be found on a bronze tablet bearing the likenesses of Hammermill's founders.

About one-half of Hammermill's employees at present have been with the company 10 or more years. Many have service records far beyond the 20-year mark. For example, 58 men and women are celebrating 25 years of service this year, and 20 others, 30 years of service. Each employee reaching his 20th anniversary is presented with a diploma of honor and given a gold watch or share of company stock. Honor pins are presented on other anniversaries.

◆

CANADA AGREES TO EXPORT PULPWOOD TO THE U. S.

A joint announcement by the Canadian Timber Controller and the Pulp and Paper Division of the War Production Board stated that Canada has agreed to exert "every possible effort" to export 1,550,000 cords of pulpwood to the United States this year from territory east of the Cascade Mountains in British Columbia. The agreement also provides that Canadian mills will ship 1,170,000 tons of pulp to the United States in 1943.

It was stated, however, that there was no possibility that fir logs could be exported from British Columbia at this time. Bad weather conditions in British Columbia and the Puget Sound areas have practically exhausted log inventories on both sides of the border.

The Canadian Timber Controller and WPB officials agreed to review the pulpwood situation again on April 1, and each 60 days thereafter.

The export of pulp logs from British Columbia will be so arranged as to maintain mill operations at the same percentage of producing capacity in both United States and Canada, the announcement said, and will provide the same number of days supply to both the Canadian and American operators.

◆

▶▶▶ WOOD AND PULP PRODUCTION hit a record high of 10,142,000 tons in 1942, some 133,000 tons above the previous record set in 1941, according to Fred G. Stevenot, president of Puget Sound Pulp and Timber Company of Bellingham, Washington. Consumption outran production, and also set a record around 10,923,000 tons, about 76,000 tons more than in 1941. Production tapered off after the March peak, affected by declining orders, manpower diversion, lack of transportation, the Canadian embargo, and government curtailment of certain Pacific Northwest mills.

◆

NEWTON PAPER CO. MAY BUY DEFUNCT TAYLOR-LOGAN CO.

Newton Paper Company of Holyoke, Massachusetts, is taking steps to purchase the land, water power, and buildings of the defunct Taylor-Logan Paper Company in Holyoke.

The Newton company plans to repair the property, use it for storage during the War, and convert it to manufacturing after the War. Newton has purchased the interest of the Reconstruction Finance Corporation, and is also acquiring the tax-title interest of the City of Holyoke. Machinery in the buildings is not included in the transaction and remains in the possession of the Reconstruction Finance Corporation.

◆

I. P. CO. LEASES BOARD MILL TO FT. WAYNE CORR. CO.

The Fort Wayne Corrugated Paper Company, Fort Wayne, Indiana, recently leased from the Southern Kraft Division of International Paper Company, its paperboard mill in Hartford City, Indiana. The mill was formerly owned by the Fort Wayne firm and was sold to International in 1938. Since that time it has been unused ex-

Distributors

ALABAMA
Birmingham — The Young & Vann Supply Company
Mobile — McGowin-Lyons Hdwe. & Supply Company

ARIZONA
Kingman — Tarr, McComb & Ware Commercial Company
Tucson — Albert Steinfeld & Co., Inc.

ARKANSAS
Helena — Lewis Supply Co.
Pine Bluff—Arkansas Mill Supply Co., Inc.
Texarkana—Buhrmann-Pharr Hdwe. Co.

CALIFORNIA
El Centro — Imperial Hardware Co.
Fresno and Los Angeles — Pacific Mill & Mine Supply Co.
Oakland — Bay City Iron Works
Sacramento — Sacramento Rubber Co.
San Francisco—Honolulu Iron Works Co.

CONNECTICUT
Bridgeport — Hunter & Havens, Inc.
New Haven—The Page, Steele & Flagg Co.
Plainville — Ideal Machinery Co.
Stamford — The Geo. W. Southwick Co.
Waterbury — The White Supply Co.

DISTRICT OF COLUMBIA
Washington — Nat. Equip. & Supply Co.

FLORIDA
Jacksonville—The Cameron & Barkley Co.
Miami — The Cameron & Barkley Co.
Tampa — The Cameron & Barkley Co.

GEORGIA
Atlanta — Fulton Supply Co.
Columbus — Columbus Iron Works Co.
Rome — Battey Machinery Company

ILLINOIS
Chicago and Moline — Sterling Products Company, Inc.
Decatur — The Field & Shorb Co.
Quincy — E. Best Plbg. & Htg. Supply Co.

INDIANA
Indianapolis — Van Camp Hardware & Iron Co.

IOWA
Des Moines — Globe Machinery & Supply Company

KANSAS
Leavenworth — Great Western Mfg. Co.

KENTUCKY
Hopkinsville — Cayce Mill Supply Co.
Louisville and Lexington — Tafel Electric & Supply Co.
Paducah — Henry A. Petter Supply Co.

LOUISIANA
Monroe — Weaks Supply Company, Ltd.
New Orleans — Standard Supply & Hdwe. Company, Inc.

MAINE
Portland — W. L. Blake & Company

MARYLAND
Baltimore — The L. A. Benson Co., Inc.
Salisbury — The R. D. Grier & Sons Co.

MASSACHUSETTS
Fall River — Harold F. Wordell
Holyoke — J. Russell & Co., Inc.
Lowell — The Fairgrieve Belting Co., Inc.
New Bedford — Manufacturers' Supply Company, Inc.
Taunton—The Pierce Hardware Co., Inc.

MICHIGAN
Battle Creek — Kendall Hdwe. & Mill Supply Company
Bay City — Chevrier Supply Co.
Escanaba — Delta Hardware Co.
Houghton — I. E. Swift Company
Kalamazoo — Kalamazoo Mill Supply Co.
Lansing — Michigan Supply Co.
Marquette—Soo Marquette Hardware Co.
Menominee—North'n Hdwe. & Supply Co.
Port Huron—Moak Machine & Supply Co.
Sault Ste. Marie — Soo Hardware Co.

MINNESOTA
Duluth — Kelley-How-Thomson Co.

MISSOURI
Kansas City — Langdon Supply Co.
Richards & Conover Hdwe. Co.
H. R. Williams Mill Supply Company
St. Joseph—Jamieson Machine Company
NEBRASKA
Omaha — American Machinery & Supply Company
NEW HAMPSHIRE
Keene — M. S. Perkins Machine Co.
NEW JERSEY
Newark—Dodge-Newark Supply Co., Inc.
Passaic — New Jersey Eng. & Supply Co.
NEW YORK
Buffalo — Weed & Company
Elmira — Barker, Rose & Kimball, Inc.
Lockport—Ward Bros. Mill Supply Co., Inc.
Newburgh — W. L. Smith
Rochester — Haverstick & Company, Inc.
Syracuse — Onondaga Supply Co.
Troy — Fred K. Blanchard, Inc.
NORTH CAROLINA
Charlotte — The Textile Mill Supply Co.
OHIO
Findlay & Toledo — Bearing & Transmission Co.
Akron & Massillon — The Hardware & Supply Co.
Cincinnati — The Scallan Supply Co.
Cleveland — The Geo. Worthington Co.
Columbus—The Smith Bros. Hardw'e Co.
Dayton — Dayton Industrial Supply Co.
Mansfield — The Hughes Supply Co.
OKLAHOMA
Oklahoma City — Federal Supply Co.
OREGON
Klamath Falls — Lorenz Company
Portland — Harris Supply Company
PENNSYLVANIA
Allentown — William H. Taylor Co., Inc.
Pittsburgh — Somers, Fitler & Todd Co.
Reading — Brown Engineering Company
Scranton — The Chas. B. Scott Company
Wilkes-Barre — Eastern Pennsylvania Supply Company
York — George F. Motter's Sons
RHODE ISLAND
Providence — W. E. Lamarine
SOUTH CAROLINA
Charleston—The Cameron & Barkley Co.
Greenville — Hugh Black
TENNESSEE
Jackson — Southern Supply Company
Knoxville—Tenn. Mill & Mine Supply Co.
Memphis — Lewis Supply Company
Nashville — Keith, Simmons Co., Inc.
TEXAS
Dallas — The Murray Co.
El Paso — Momsen-Dunnegan-Ryan Co., Inc.
Houston — Peden Iron and Steel Co.
UTAH
Salt Lake City—The Salt Lake Hdwe. Co.
VERMONT
Burlington — Hagar Hdwe. & Paint Co.
VIRGINIA
Lynchburg—Barker-Jennings Hdwe. Corp.
Newport News — Noland Company, Inc.
Norfolk — Taylor-Parker Company, Inc.
Richmond — Industrial Supply Corp.
Roanoke — Noland Company, Inc.
WASHINGTON
Aberdeen — Mill & Logging Supply Co.
Seattle — Chas. H. Harden Co.
Spokane—Wash'ton Mach'y & Supply Co
Tacoma and Olympia — Ducharme Belting and Rubber Company
Yakima — Yakima Hardware Company
WEST VIRGINIA
Elkins — Valley Supply Company
Fairmont — Fairmont Supply Co.
Huntington — Banks-Miller Supply Co.
WISCONSIN
Eau Claire — W. H. Hobbs Supply Co.
Green Bay — Morley-Murphy Company
Milwaukee—Morman Belting & S'pply Co.
Racine — Mohr-Jones Hardware Co.
Sheboygan — Frank Geele Hdwe. Co.
Wausau — D. J. Murray Mfg. Co.

On Severe Paper Mill Drives, Waterproof Research Leather Belting Outperforms Rubber Belts

On pivoted base drives — beaters, jordans, chippers, pumps — Research Leather Belting has the necessary pliability to take that constant flexing with less internal friction than any other belt — rubber or leather. Its built-in pulley grip permits less tension to be used, relieving wear on bearings as well as belt. Natural overload capacity is another advantage.

On fixed center drives — especially for high speed, high torque, cone pulleys — Research Leather Belting maintains uniform speed much longer, with fewer stops for takeup. Excessive stretch is eliminated in manufacturing, so more power is delivered — at least 3% more production guaranteed.

Research Leather Belting on Pivoted Motor Base Drive

GRATON & KNIGHT CO., Worcester, Mass.

Only leather belting manufacturer with complete nation-wide service facilities. Branches in Chicago, Cleveland, Dallas, Detroit, Kansas City, Minneapolis, New York, Philadelphia, San Francisco. See adjoining column for distributors (also listed in THOMAS' REGISTER.)

cept for a brief period of operation during 1941.

About 125 men are employed in the mill, production having begun March 1. According to H. M. Treen, president of the Fort Wayne Corrugated, the reopened mill will supply extra raw material needs, and under the arrangement, the Southern Kraft Division of I. P. Company will absorb the output of the mill over and above the needs of the Hartford City box plant.

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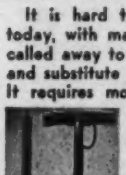
C-W DIV. AWARDS SERVICE PINS TO 75

At a banquet attended by more than 100 employees and officials of the corporation, J. D. Zellerbach, president of the Crown Willamette Division of the Crown Zellerbach Corporation, Camas, Washington, presented service pins to a group of 75 men and women. The service records ranged from 5 to 35 years, and several of those who were awarded pins are now on leave of absence to serve in the armed forces. Their pins were presented to near relatives.

This company counts all service men as on "military leave," which means they keep their seniority and are assured of return to their former jobs when the War ends.

ARE YOU PROUD OF YOUR PAPER?

It is hard to maintain quality standards today, with many of your experienced men called away to service, and often new pulps and substitute chemicals with which to work. It requires most systematic care in paper making. We suggest as an important first step the routine use of the Cambridge Surface Pyrometer for checking roll temperatures in the drying roll train. Proper progressive temperatures here will go a long way in preventing spots, cockle, curl and blisters.



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CAMBRIDGE
SURFACE PYROMETERS

HOURLY WORKERS WIN VACATIONS AT HAMMERMILL

A newly-liberalized policy of Hammermill Paper Company, Erie, Pennsylvania, has added more than 300 men and women to the list of those eligible to receive paid vacations.

The company has announced that all hourly employees are eligible for one week's vacation with full pay and bonus after they have completed but one year of service in the organization. Mill workers start receiving two full weeks with pay when they reach the ten-year service mark. However, because of the acute manpower shortage, many of the workers will be paid the money but will enjoy no time off, according to Vice President M. Harrison of the Hammermill Industrial Relations Department.

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▶▶▶ NEWSPRINT IMPORTS into New Zealand during the first 6 months of 1942 showed a decrease of 94 per cent, compared with the corresponding period of 1941, according to the *Foreign Commerce Weekly*. Imports of wood pulp and paper pulp into New Zealand declined 84 per cent during the first 6 months of 1942, compared with the corresponding period of 1941. During 1942, Sweden produced 160,000 tons of wallboard. This amount represents two-fifths of the total production of the European Continent, which is estimated at 400,000 tons.

◆

▶▶▶ AVAILABLE TIMBER is sufficient to keep Oregon City paper mills in operation for the next 100 years, testified John H. Smith, president of the Hawley Pulp and Paper Company, in an SEC hearing on reorganization plans of the Portland Electric Power Company.

◆

▶▶▶ ACCORDING TO A STATEMENT by John Atkins, administrator of printing, publishing, and allied industries under the Canadian Wartime Prices and Trade Board, no further curtailment of print paper is contemplated for the second quarter of 1943.

◆

▶▶▶ THE CANADIAN SPLINT and Lumber Corporation has purchased the pulp mill property of the Canadian Northern Power Corporation. This mill has not been in operation for several years, and extensive alterations to the building will be necessary before the production of match splints is begun.

▶▶▶ THE WARTIME MACHINE SHOP Board of the pulp and paper industry of Canada values work in progress at approximately $2,800,000, while work done under the "bits and pieces" program during 1942 totaled $2,400,000. It is expected that the value of deliveries during the current year will be materially increased provided that necessary raw materials can be obtained.

◆

KENNEBEC DIV. FORCED TO HALT WORK ON NEW MILL

The Kennebec Division of Hudson Pulp and Paper Corporation (formerly Kennebec Pulp and Paper Company), Augusta, Maine, has been forced to halt work on its new mill under construction since 1941. Although the actual mill buildings have been completed, the machinery has not been obtained because of the War.

Labor shortages have been felt in all departments of the plant, especially in the cutting room where the finished product is packed and shipped. Women have been employed to replace men, but now they are almost as hard to obtain as men.

◆

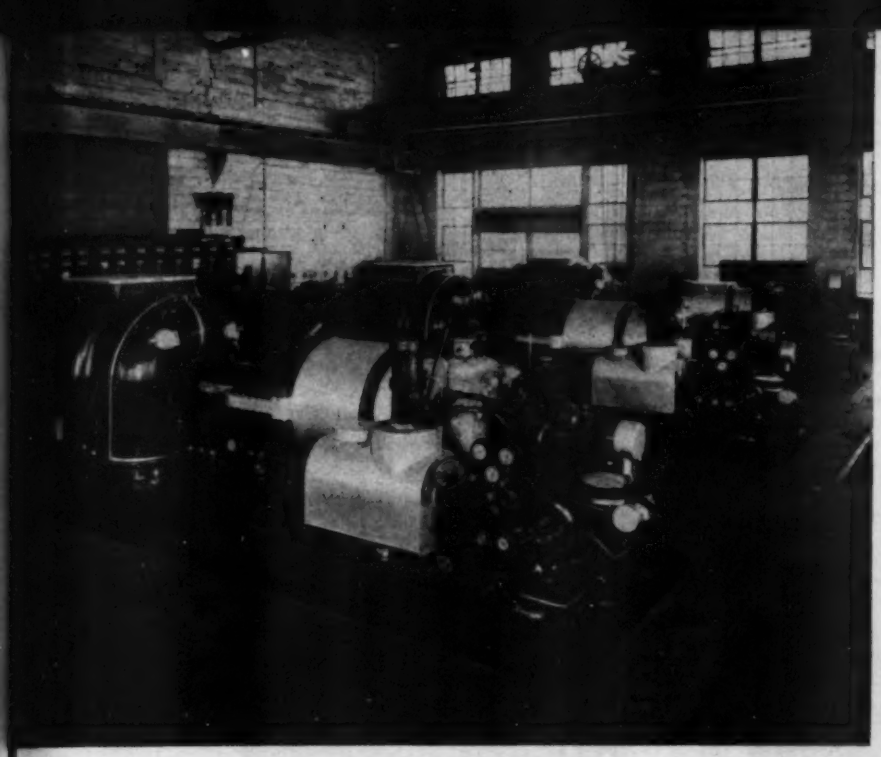
▶▶▶ Export manager of the Union Bag & Paper Corporation, New York City, *Robert A. Stevens* has been named a member of an informal advisory committee which will meet with government representatives under the auspices of the Bureau of Economic Warfare to consider export problems of the paper industry. Mr. Stevens has been associated with export trade in the United States for the past forty years.

◆

TWO CANADIAN NEWSPRINT MILLS HAVE CLOSED DOWN

Abnormal weather conditions, seriously interfering with transportation, have caused two of Canada's largest newsprint mills to close down. The tonnage has been transferred to other mills, and other emergency methods adopted to assure solution of the supply problem without any serious loss of production. The names of the mills were withheld by the authorities.

The situation is, of course, a temporary one; however, contingent upon the arrival of warmer weather, the American publishers who have adequate stocks are asked to inform their source of supply of this fact, and so help maintain a reasonable pool out of which to care for orders of newsprint from others whose normal source of supply has been disturbed.



Records made on the three turbines above show how clean turbine oil systems stay with Nonpareil Turbine Oil.

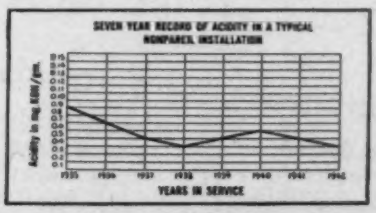
Service record shows how to get cleaner turbine operation

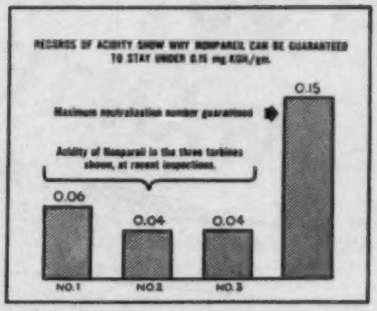
● A comparison of turbine oil operation is difficult to make. Conditions vary from plant to plant. The type of turbine, and operating practices and needs affect oil performance. But here is a case where conditions were, as nearly as possible, identical—where the performance of an oil that is fully protected against acidity and sludge formation could be fairly rated in direct comparison with a conventional oil.

Here are the conditions. The three 1500 KW turbines in a middle western power plant, shown above, are the same make. All operated eight years on Nonpareil Turbine Oil. All maintained an excellent record for low acidity and cleanliness. Then, for reasons not connected with the oil, the No. 3 turbine (extreme right in the picture) was filled with a conventional oil. And troubles started popping. Bearing temperatures rose. Sludge clogged oil screens. Oil had to be centrifuged continuously.

Another turbine was tried. When the troubles continued, it was thought that some mechanical difficulty in the turbine might be the cause. At the yearly overhaul period, No. 3 turbine was put back on Nonpareil, and turbine No. 1 was filled with a new batch of the conventional oil. The troubles switched over to No. 1. Bearings overheated; screens clogged and had to be cleaned every 60 days.

Back to normal. In the meantime, turbine No. 2 which had operated continuously, and No. 3 which had been refilled with Nonpareil, were giving no trouble. Acidity was low, and screens and coolers were cleaned only at the yearly inspection period. That was enough evidence for this operator. Nonpareil Turbine Oil is again in all three units.




RECORDS OF ACIDITY SHOW WHY NONPAREIL CAN BE GUARANTEED TO STAY UNDER 0.15 mg KOH/gm.
Maximum neutralization number guaranteed
0.15
Acidity of Nonpareil in the three turbines shown, at recent inspections.
0.06
0.04
0.04
NO. 1
NO. 2
NO. 3

Acidity control in Nonpareil. The low acidity of Nonpareil in the three turbines, as shown by the figures above, is obtained by the use of a *patented* inhibitor which is added to a highly refined oil from which the asphaltene-forming hydrocarbons have been removed. This also accounts for the unusually clean operation secured with Nonpareil. Its neutralization number is *guaranteed*, in writing, not to exceed the low limit of 0.15 mg.KOH/gm. for the life of your turbine.

COMPARISON OF SERVICE REQUIREMENTS BETWEEN NONPAREIL AND COMPETITIVE OIL

Noted during the period when turbine No. 1 was operating on a competitive oil and turbine No. 2 was operating on Nonpareil.

	Nonpareil	Other Oil
Oil Centrifuged . .	Every 30 days	Continuously
Screens cleaned . .	Yearly	Every 60 days
Oil replacements .	None	Yearly
Bearing temp. . .	140°—145°	160°—165°

Get all the facts. A Standard Lubrication Engineer can tell you many other operating advantages of this patented type of turbine oil. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the Engineer nearest you. In Nebraska, write Standard Oil Company of Nebraska, at Omaha.

★ ★

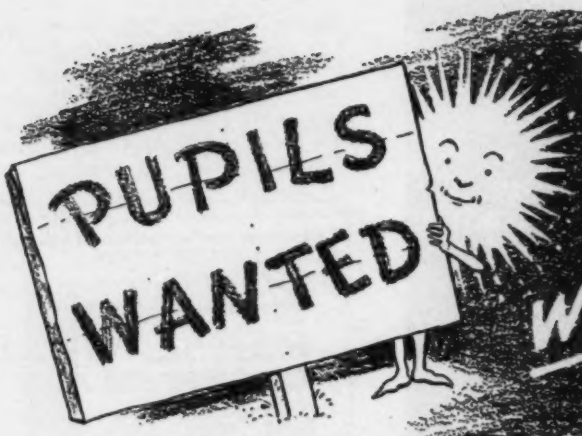
NONPAREIL
TURBINE OIL

★ ★

OIL IS AMMUNITION . . . USE IT WISELY

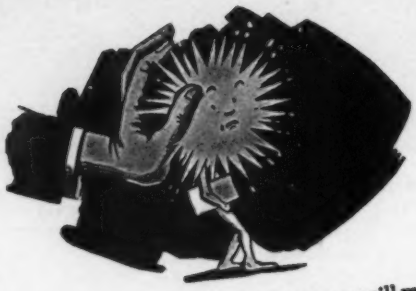
STANDARD OIL COMPANY (INDIANA)

★ LUBRICATION ENGINEERING



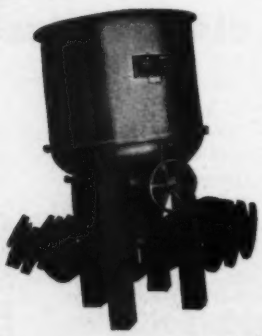
The B-C-S-D SCHOOL for WAYWARD IDEAS

Are you sometimes baffled by your own ideas? Do you sometimes wish you could find out their value?



You're in luck if your ideas are about paper mill machinery. Send them to the B-C-S-D school . . . tuition free.

Here each idea gets a schooling you could never give it . . . a real check-up to determine its worth.



And here's one idea in graduation clothes . . . also furnished by B-C-S-D. (Illustrated . . . Dilts Hydrapulper)

A SERIOUS NOTE ON SENDING IN IDEAS

Scientists agree that after the war, a tremendous technical boom will take place. Your idea may have a part in this boom . . . and we would enjoy helping you find out.

So send us your thoughts on paper mill machinery . . . no matter how unimportant they may seem to you. Remember, many great products originated in seemingly trivial ideas. We will make the examination . . . giving you, of course, full protection and compensation.

The Black-Clawson Co., Hamilton, Ohio
Shartle Division, Middletown, Ohio
Dilts Division, Fulton, N. Y.

BLACK-CLAWSON-SHARTLE-DILTS

No. 1 IN PAPER MILL MACHINERY RESEARCH

WRAPPINGS AND CONTAINERS MADE MOISTURE-VAPOR RESISTANT

with ECONOMICAL

Cyanamid Laminating Waxes

When one thinks of moisture-vapor resistance it usually brings to mind the utilization of a coating substance to retard the penetration of moisture into wrapping or cartoning materials. But coatings that are flexible even at ordinary temperatures, low enough in cost, non-tacky, as well as providing a reasonably satisfactory resistance to moisture-vapor transfer, are not generally available at the present time.

Improved Laminating Material

While too tacky or dark in color to be satisfactory as a coating material, BENOWAX* when used as a laminating substance between two or multiple surfaces of paper or board effectively prevents the transfer of moisture-vapor without impairing the flexibility of the wrapping or cartoning material.

The different grades of BENOWAX are straight amorphous petroleum waxes, unadulterated by the addition of any modifying ingredients. Available in colors ranging from amber to black, and melting points from 140° F. to 175° F., the various grades of BENOWAX afford a broad choice to suit the user's requirements.

Tests Prove Effectiveness

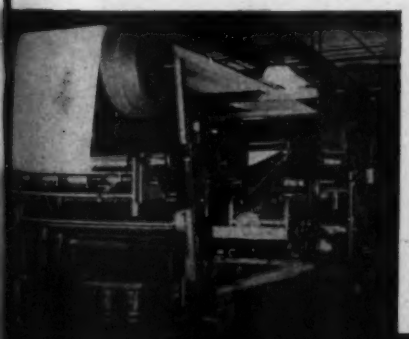
Papers laminated with the various grades of BENOWAX have been exhaustively tested by Cyanamid paper chemists and the results have been substantiated by users. This has provided data of timely interest for the manufacturer confronted with the moisture-vapor problem. Outstanding among these are the following facts concerning the characteristics of BENOWAX:

1. The moisture-vapor resistance of BENOWAX compares favorably with many films ordinarily considered moisture-vapor proof.
2. It provides substantial grease and oil resistance.
3. It exhibits good pliability, fair to strong adhesive power, depending upon the grade.
4. Some grades protect package contents from deterioration due to light.
5. It is low in cost (a fraction of that for most materials that have been used for rendering paper moisture-vapor resistant).

Method of Using Benowax

In using BENOWAX for laminating, the material is simply heated to the proper temperature and applied to the papers or boards, which are then combined on suitable equipment. No heat curing or drying operation is required; the laminated product is merely allowed to cool.

Your Cyanamid representative will be glad to discuss these and other specific applications with you . . . make recommendations on grades of BENOWAX to meet your needs. Or, you may write:



One type of continuous laminating machine, with trimmer and sheeter, being used for laminating paper to boxboard with BENOWAX.

BENOWAX laminated wrappings and cartons enable manufacturers to step in and replace certain metals and other critical materials formerly used for many special types of product packaging. Pastry, tobacco, cereals, coffee, dehydrated foods, are among the many products effectively packaged with BENOWAX laminated stocks.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER [illegible] N. Y.

DISTRICT OFFICES: Boston, Massachusetts; Philadelphia, Pa.; Baltimore, [illegible]
Cleveland, Ohio; Chicago, Illinois; Kalamazoo, Michigan; Detroit, Michigan; St. Louis, Mi[illegible]

Waxes • Resin Sizes • Synthetic Resins
Casein • Alum • Corn Starch • Tapioca
Flour • Sulphonated Oils • Fillers
Defoamers • Soda Ash • Caustic Soda
Salt Cake • Acids • Clays • Satin White
Aerosol® Wetting Agents • Calmicro®
(Calcium Carbonate) and other
Paper Chemicals

®Reg. U. S. Pat. Off.

WHEN IT'S AN ABRASIVE PROBLEM, CALL IN NORTON ENGINEERING SERVICE

NORTON COMPANY
WORCESTER, MASS.

KEEP 'EM CLEAN TO KEEP 'EM WORKING

You don't have to argue with a man up at the front that it's just good sense to keep guns clean to keep 'em working. Nor do you have to argue with experienced men on the front line of production that the same thing holds true for motor control. Of course you *have to* keep motor control contacts clean . . . but *how* are you going to do it? Why make an *extra* maintenance chore of it—especially when men are so scarce? Specify Cutler-Hammer Motor Control with the VERTICAL *dust-safe* contacts that *shed* dirt and *keep themselves clean*. That's the direct way of insuring unfailing motor control performance . . . and there's no extra cost. CUTLER-HAMMER, Inc., 1392 St. Paul Avenue, Milwaukee, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ont.

CUTLER-HAMMER
MOTOR CONTROL
C-H

Cutler-Hammer Vertical Contacts

CUT IS THE OPEN—NOTHING TO HIDE—You can see the clean contacts in Cutler-Hammer Motor Control as soon as you open the case. They're out in the open where they can work cooler and last longer.

I'll Live to bury 'em All!

Designed and built to outlive any similar type of small valve, Chapman's forged steel List 960 becomes the "oldest resident" wherever it's installed, on lines from ¼" to 2". And for especially severe duties, this valve may be had with superhardened seats and plugs which impart *even longer life.* So bury all your small-valve troubles for the duration. Standardize on List 960 . . . made in both outside and inside screw models . . . okay for all pressures up to 750 lb. at 800° F., and cold working pressures to 1500 lb. The Chapman Valve Mfg. Co., Indian Orchard, Mass. Branches in key cities.

CHAPMAN LIST 960

The Small Steel Gate Valve that's made extra-tough for Extra Life

Right: Because of the Cleveland Tramrail system more rolls can be stored in this storage room. The rolls can easily be piled two or three high. Aisle space may be reduced considerably.

Below: The many rails covering the room converge to a central rail over which all rolls going into or out of storage are conveyed. Easy sliding switches make it a simple matter to switch to or from any rail.

THOUSANDS OF TONS

HANDLED AT INTERLAKE TISSUE

. . . *with* CLEVELAND TRAMRAIL

Thousands of tons of famous Interlake toilet tissue, hand towels and napkins have been handled on the Cleveland Tramrail system at the Interlake Tissue Mills Co., Ltd., Merriton, Ontario, since it was installed in 1929.

The rolls, which weigh from 650 to 1000 pounds, are picked up with electric hoists and delivered from the slitting machine to storage room and thence to the cutting and wrapping machines. About 75 rolls are easily handled per day over the smooth rails by one man.

The Tramrail system is laid out to provide complete coverage of the storage room which has a capacity of 250 rolls. Rolls may be delivered to or transported from any part of the room.

Since installed the Cleveland Tramrail system has been used continuously. It has always performed satisfactorily and has never required anything more than minimum maintenance.

GET THIS BOOK!

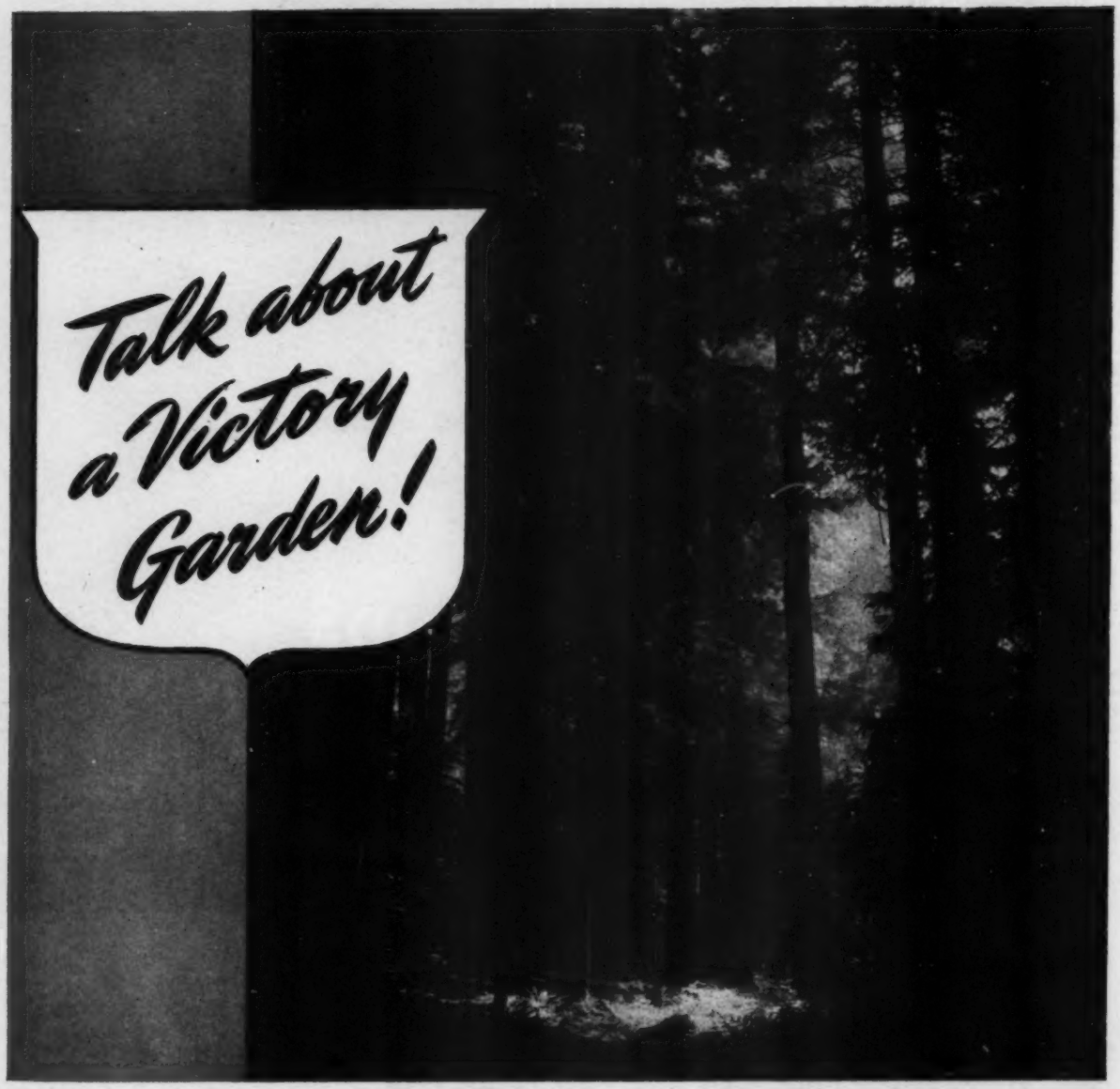
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1165 EAST 283rd ST. WICKLIFFE, OHIO.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

LET No. 2008 Packed with valuable information. Profusely illustrated. Write for copy on your company letterhead



IN harvesting our timber crop, we are finding as a nation that our forest land is a tremendous victory garden. • Its fruits include staples like rough and finished lumber . . . like a hundred kinds of paper to promote and sustain the vitality of enterprises military and civilian. • And the forest yields an endless variety of essential products like fabrics, special packages, plastics . . . even gunpowder. • It is fortunate for this country and its allies that vast forests like those of the Pacific Northwest are yielding an abundant and continuous supply of things needed at home and abroad by men at war.

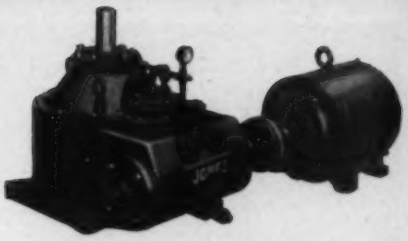
Pulp Division
Weyerhaeuser Timber Company

BLEACHED AND UNBLEACHED SULPHITE PULP
Mills at Longview, Washington • Everett, Washington

To help you SPEED PRODUCTION

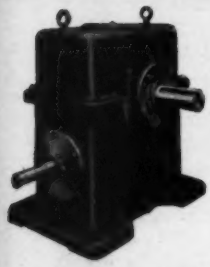
HERRINGBONE REDUCERS

Available in single, double and triple reduction types in a wide range of ratios and ratings.



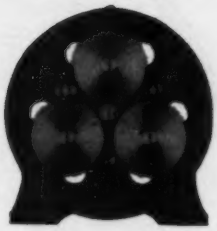
WORM-HELICAL SPEED REDUCERS

A versatile line of double reduction units for agitators, mixers or other applications requiring a vertical shaft drive.



WORM GEAR REDUCERS

Built in light and heavy duty types and in various styles to suit the conditions.



SPUR GEAR REDUCERS

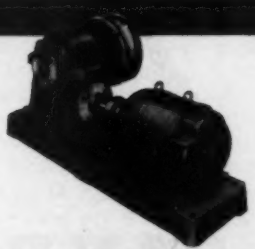
Concentric straight line drive in single and double reduction units.

CUT AND MOLDED TOOTH GEARS

Jones gear cutting practice represents the accumulated technical knowledge of 50 years backed by the finest gear cutting equipment and craftsmanship.
The line covers cut tooth spur, helical, herringbone, warm, bevel, and mitre gears of high test cast iron, steel, bronze, or non-metallic material. An extensive line of patterns is also available for high test cast iron molded tooth, spur, bevel and mitre gears.

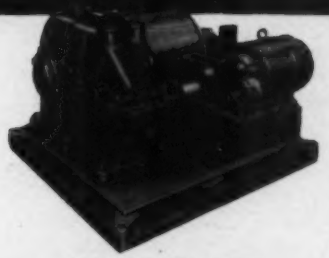
CAR PULLERS

These car pullers are built by Jones as complete units with motor included if desired, or with base to take purchaser's motor. The cable drum is driven by a Jones double or triple reduction Herringbone speed reducer and the control station may be located at a point to give the operator a clear view of the tracks and spotting positions.



DOOR HOISTS

The Jones Door Hoist is a simple, compact and sturdy heavy duty worm gear driven unit that has been widely used in the steel industry for handling furnace doors. It is also applicable to other services where doors of various types must be opened and closed and where it is desired to avoid the complications of limit switches.



SKIP HOIST DRIVES

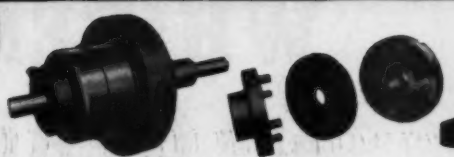
Jones Skip Hoist Drives are equipped with all the modern protective devices such as cam or nut type limit switches, solenoid or disc type brakes and slack cable switches. Drives are standard Jones Herringbone Speed Reducers.

PULLEYS

Jones pulleys are machine molded, poured of high test cast iron, and are accurately finished and balanced. Single arm, double arm, multiple piece and extra heavy conveyor pulleys and flywheels can be supplied.

V-BELT SHEAVES

Made of high test cast iron. Sheaves for "AB" light duty combination and "C" belts in stock with keyseated bushings. Standard and special sheaves for all industrial belt sections made to order.

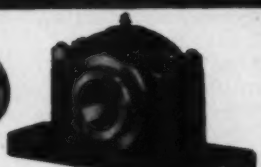


CLUTCHES

Built for a broad range of shaft sizes and ratings in both enclosed and open types for sleeve and coupling work. In addition they are available in a line of friction clutch pulleys. This clutch modification is also used with gears, V-belt sheaves or sprocket wheels.

COUPLINGS

High and low speed flexible couplings, flange, keyless compression, ribbed and jaw clutch couplings.



PILLOW BLOCKS

Jones Pillow Blocks have double row Timken Roller Bearings locked firmly to the shaft by means of a tapered split steel adaptor and clamp nut. Effective seal retains lubricant . . . easily removed from shaft.

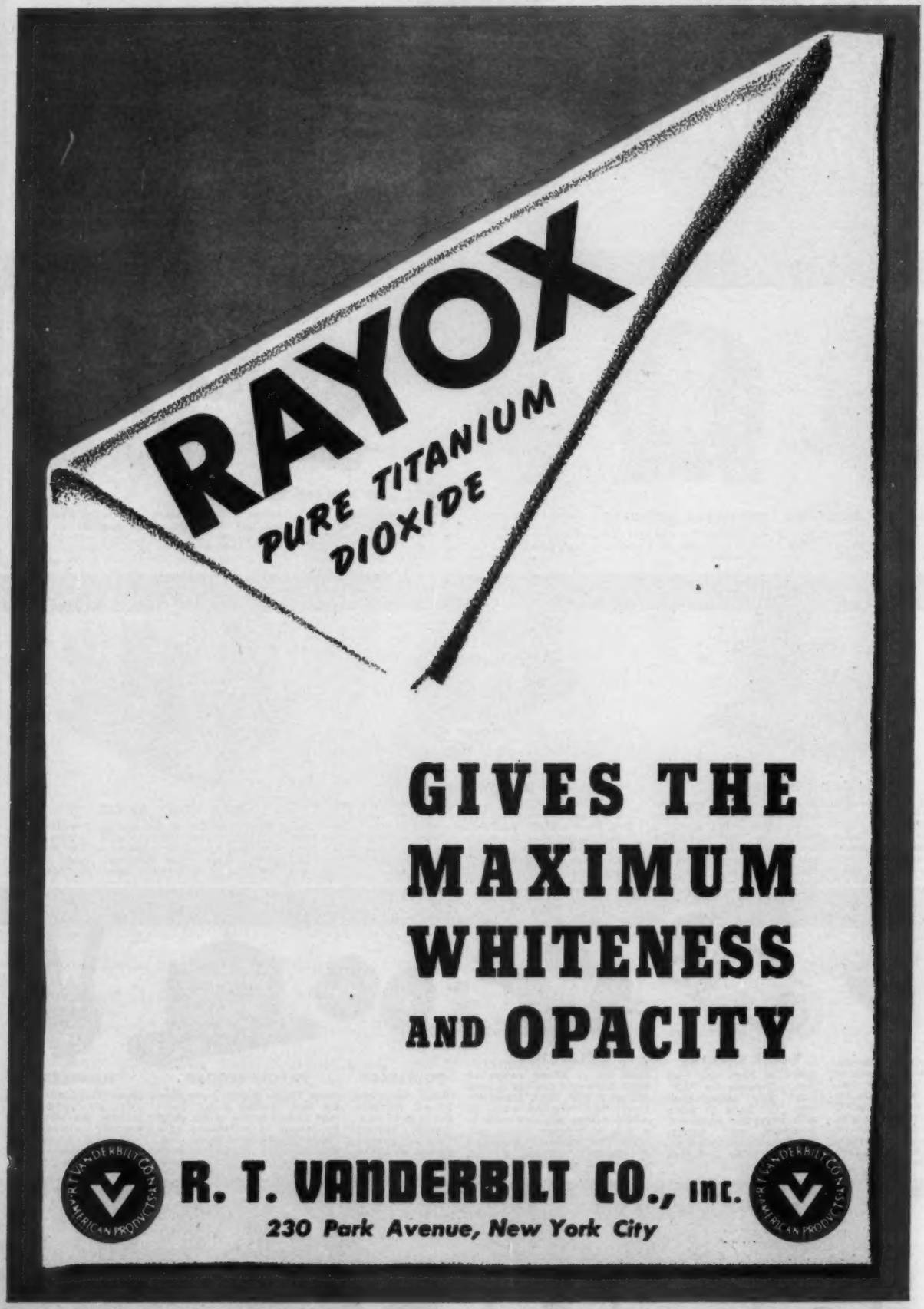
HANGERS

Jones drop hangers, post hangers and bracket hangers are strongly reinforced with arch bracing. Free universal adjustment. Feet are ground.

Jones

BULLETIN No. 80

Jones Drives for Industry may be helpful in giving you a complete picture of the Jones products, engineering services and manufacturing facilities that are available. Your request will bring a copy.


RAYOX
PURE TITANIUM DIOXIDE
GIVES THE MAXIMUM WHITENESS AND OPACITY
R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

. . . . . Editorial . . . . .

The Pulpwood Problem

▶▶▶ THE BELATED RECOGNITION of the critical problem facing the production of paper products essential to the war effort has made its appearance finally after months of effort by the Advisory Boards of the paper industry to get such recognition from the War Production Board.

A copy of a memorandum to M. L. Wilson, Director Extension Service, United States Department of Agriculture, from Arthur G. Wakeman, Director, Pulp and Paper Division, War Production Board, subject: *Pulpwood Production from Farm Woodlands in 1943*, dated January 22, 1943, was just released to the paper and pulp manufacturers on February 25, 1943.

It states that the Army, Navy and Office of Civilian Supply have placed their 1943 pulp and paper requirements at a level considerably in excess of the probable available supply of pulpwood and that "the anticipated shortage of pulpwood is expected to arise principally from the widespread manpower shortages which are developing in woodlands throughout the United States."

The memorandum does not set forth what the required "level" for 1943 pulp and paper is; it only states that the tonnage is "considerably in excess of the probable available supply of pulpwood."

According to the memorandum, the pulpwood supply during 1943 will be 25 per cent below the 1942 supply. As the 1942 supply was twenty-five million cords, 25 per cent shrinkage would indicate 18,750,000 cords for 1943, which would in turn indicate a pulp and paper supply of approximately ten million tons as of January 22, 1943.

However, the anticipated shrinkage in pulpwood is properly attributed to the widespread manpower shortages which "are developing in the woodlands throughout the United States."

In December, 1942, the War Production Board estimated a 20 per cent shortage of pulpwood; in January, 1943, they put it at 25 per cent, and by April 1, there will probably be 30 per cent decrease in the cut, indicating a possible production of pulp and paper available for 1943 at almost a 50 per cent shrinkage as compared with 1942.

The memorandum says "It is now evident that the wood pulp requirements for 1943 will be considerably in excess of the probable supply of pulpwood. Therefore, it will be necessary to produce during the current year, all of the pulpwood that can be cut in the various regions."

Of course, that is the obvious conclusion, but how can the pulpwood cut be increased in view of these facts: that some 1,615,000 men have been taken by draft and enlistments in the armed forces and the call is still on for more of them; that hordes of farmers and forest and field laborers have gone into the essential industries, lured by high wages, from which they will not willingly return to lower paid farm work; that there are Office of Price Administration ceilings upon pulpwood which provides no incentive to the remaining owners of wood or to labor to cut.

The whole critical situation stems from the manner in which the manpower administration has been handled.

A forty-eight hour work week in the forests will not meet production requirements—the men are not there to cut and transport the wood. Likewise, the recall of production restrictions would have no remedial effect on the production of pulpwood.

The pulpwood cut cannot be increased until proper plans and adequate incentives are provided—the solution to the entire problem seems to hinge first of all upon the accepted *essentiality* of pulp and paper.

Tomorrow's Horizon

▶▶▶ IN THE WORDS OF COLERIDGE, "So often do the spirits of great events stride on before the events, and in today already walks tomorrow." Surely, from today's events, kaleidoscopic and momentous as they are, will be fashioned our world of tomorrow.

If that fashioning is to be to the liking of American industry and business, and to the citizenry of this country, it is necessary now to think and plan in terms of the postwar era. The need for such action was presented very clearly by Edward L. Bernays, Counsel on Public Relations, in an address before the Fourteenth Boston Conference on Distribution. Mr. Bernays' subject was, "The Future of Private Enterprise in the Postwar World."

The following comments are taken directly from his address.

"We shall have to go from war to peace in terms of a planned approach to a continuing problem if chaos is not to result . . . Any plans we make must be based on an initial great handicap, and that is, the peace cannot be forecast sufficiently in advance for a gradual reduction of production . . .

"Private enterprise must formulate plans now that will convince the people that their interests will be safeguarded for the broadest good and to the best possible effect.

"The industrial and commercial world must undertake important research, and then undertake to build plans that will make a free enterprise world thoroughly and fairly workable. But private industry must assume leadership if it really wants private enterprise and democracy to survive into the postwar world.

"Many governmental, private and non-private agencies, as well as industrial agencies, have already initiated studies and researches. Their work is good, but it needs to be expanded and co-ordinated . . .

"Business cannot depend upon the public for its survival. It can depend only upon itself and its own actions. Commerce and industry must recognize that what serves the public interest serves its own interest as well. If it will act on the recognition that private function activities must be predicated on public interest and responsibility, there will be less to fear . . . Business has often been greedy and stupid. Unless it takes these facts into consideration, leaders of industry may be dislodged by political forces, by pressure groups of the right or left, by the economic upheaval following the peace. We may see our system crumble not because of the splendid advantages private enterprise has brought us, or the guarantees of liberties it insures, but because of the way it has been abused by many.

"These problems can be solved only if the vast world of business in America will get together and work on these problems, honestly, vigorously, thoroughly. With sincere and unselfish effort we may be able to insure the future development of America as we know it."

"SeaBees"

▸▸▸ OUT OF THE DIRTY DUST of World War II, a new, colorful personage is emerging. He is a fighting man. He is a builder. His hair may be gray, or he may be a seasoned veteran at 28, with experience-lined crows'-feet under his tired eyes. He is rough: a living proof that a hard construction man with half his life behind him is still a better man than any Jap or German, born legitimately, or otherwise. *He is a SeaBee.*

Mark the name well. You have heard it before at Guadalcanal, and you will hear it again and again wherever stories of heroism and blood and horror appear. "SeaBee" is the enlargement of "CB", meaning the construction battalions of the Navy's Bureau of Yards and Docks. The Corps' insignia is a buzzing angry bee holding a machine gun with one leg and working tools with the others, flying hell-bent toward the enemy. It is perhaps the most excellently descriptive insignia of any branch of the service.

Never mind where the SeaBees are working. You will know in due time, and so will the heathen devils whose own code these builders have mastered to a finish. Yes, they are equipped and anxious to pay back in the same coin the outrage of Pearl Harbor.

Construction battalions were conceived some time ago by the Navy Department when a need arose for bases outside the continental limits of the United States. The prime aim was directed toward sending skilled construction men, also equipped to fight defensively or offensively, into zones adapted for the establishment of bases. Visualize any first class general contractor of America suddenly transferred lock, stock, and barrel to the Navy, and you have some idea of a SeaBee battalion.

The top engineers and perhaps the superintendent of the firm would be commissioned and given officer's training. Its excavation, carpenter, concrete, plumbing, electrical and mechanical foremen would be made chief petty officers, the highest noncommissioned rank in the Navy. Its best carpenters, machine operators, and lower grade foremen with good, sound experience would be given first class petty officer ratings and so on down to the general laborers, who would enter the service as seamen. Then give the whole gang some hard, rigorous military training and you have SeaBees; builders and fighters.

A typical SeaBee is 35 years old. More than likely he is married. He leaves his family behind, plus a highly paid job, and the comforts of home. He is well educated; his average being well above the high school graduate. He enters the service with a higher initial rating than any other branch can boast. But there his advantage ends and hard, trying work begins.

He is sent to Virginia for the usual inoculation and basic military training. For six weeks he forgets his knowledge of construction while he is firing live, heavy caliber ammunition, doing rigorous hiking, going through calisthenics and obstacle courses, and learning to slash murderously with a bayonet. He learns judo and all the black arts of crippling bar-room fighting. As one frightened Mississippi negro remarked, "Don't mess with them SeaBees. They tear yo' arm out and club yo' over de head wid it!"

A few specialists are selected to attend classes in camouflage, water purification, refrigeration, earth moving and the erection of masts, tanks and structural pontoons. Most of the men, already familiar through long experience with their fields, learn "the Navy way" of doing things and see specialized Navy equipment they never used before. When they shove off for "Island X", the men are even better builders than they were before, for the training has hardened them and taken pounds and inches off their waist lines.

How do these hard bitten construction men fare under military discipline? Excellently, on the whole. Construction battalions are far more democratic than certain other branches, and while the officers are respected still they are not above the realm of suggestion. One tough old shovel runner was asked recently what he would suggest as a guide for ordering replacement parts for his machine.

"Why, doggonit, find out what parts wear out the oftenest and stock at least one for each machine," he snorted. "I can name 'em for you." He pointed out in an easy, unafraid way (as if he were in fact speaking to a civilian superintendent) certain other valuable suggestions.

"You ought to keep plenty of wire rope on hand, Lieutenant," he advised. "Get preformed rope of the type recommended. Get it from any manufacturer, but insist on preformed to be safe. You'll find it'll last up to twice as long as the old kind. It means double the cargo space saved on the ship that brings it to us, and half the critical war steel used."

The lieutenant agreed, for his former firm had gone 100 per cent in favor of this type three years before. "Another advantage here," he told the old shovel runner, "is the characteristic non-wickering smoothness of the line even after it's worn too far to continue as a shovel hoist line. We can make tow ropes out of this old cable and use it for pulling tree stumps and logs; and do it without half the battalion reporting to sick bay with crown wire punctures in their hands."

That sort of spirit and inventiveness (and that is only one instance) has made the SeaBees a smooth working, efficient organization. Henderson Field on Guadalcanal Island is a tribute to their engineering skill and their coolness under fire, for there is not a a reader of this piece who will doubt the hardship and difficulties encountered there. Working and fighting 7,000 miles from home, SeaBees and Marines not only held their ground, but improved it!

It was a negro SeaBee who recently, after a long and strenuous day, defined "morale"—that thing that keeps them going. "Morale," he said, "is what keeps yo' feet movin' when yo' head says it ain't possible."

The spirit pervades all our armed forces as well, but when historians write the story of World War II they will find room somewhere for the hard rock men who went in and gouged bases out of the wilderness so our American eagles could come home to roost.

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Our ships, tanks, guns and aircraft are the front line defense of American liberty. Industrial uses of steel must be measured by actual necessity and the tonnage reduced with consideration for safety of life and fire hazard only.

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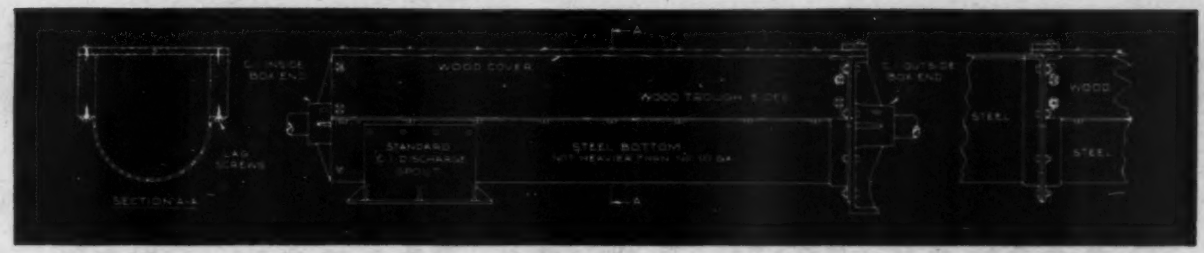

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RYERSON

Eliminating Waste in Fine Paper Mills

H. M. GRASSELT, Production Manager
Collins Manufacturing Company

▸▸▸ THE SYSTEMATIC PRESERVATION of raw materials is today, more than ever, the moral and patriotic duty of every American. Waste is, unquestionably, a detrimental and expensive factor.

In the paper industry, as elsewhere, vast fields are open for research and investigation of the problem. No ready-made plans can be offered, nor any infallible formulae applied for the successful elimination of or reduction of waste. Each plant or organization has its specific problem that requires individual study.

In *fine paper mills,* wastages and losses may be classified as follows:

1) Materials: Inefficient purchasing, storing and handling; waste in the preparation and use of materials and supplies; visible and invisible waste in manufacture; waste in fuel (power and heating).

2) Time: Poor organization of labor and inadequate co-operation between departments; excessive turnover of labor; inefficient labor and methods; circuitous intrafactory transportation and handling; waste through poor planning; and waste through accidents.

3) Administrative: Inadequate sales policies and ineffective advertising (poor copy and wrong media); neglect of research and standardization; failure to follow definite plans of organization to establish departmental responsibilities and to define definite authority; and poor labor policies.

MATERIALS

In fine paper mills, rags represent a very important part of the required raw materials. The purchase of these commodities necessitates a thorough knowledge of rag qualities, usabilities and markets. In buying, consideration must be given to the desired ultimate results and not to purchase price alone.

So-called stray lots or bargains are not always what they are supposed to be. A bargain or chance buy may be costly in the end. The purchase price may be low and show promise of a substantial saving. However, if sorting costs and final results in the finishing room are compared to the purchase price, it may be found that the "bargain" was not what its name implied.

Aside from the ever present danger of rubber and latex in certain grades, many cotton cuttings are from cloth which has been impregnated with certain chemicals to render it more water resistant. Therefore, it is imperative that the purchasing department and the laboratory work together to eliminate such harmful items before it is too late. Furthermore, the laboratory should test all samples to determine whether the colors are fast or whether they will respond to the regular treatment of bleaching.

The process of cooking and bleaching does not eliminate such chemical substances as cellulose, acetate, latex, etc.

Cost records should reveal whether the sorting costs are too high and if there is too large a percentage of outthrows. Finally, the shrinkage or "invisible waste" must be analyzed and considered.

The effect of poor or carelessly prepared raw materials will be apparent throughout all phases of manufacturing. Such materials will cause an excessive percentage of "broke" and abnormal sorting costs. Likewise, paper made from such materials will be full of rubber and dirt. A fraction of a cent more for a better grade of rags might ultimately mean a tremendous saving.

To insure uninterrupted operations, definite quantities of raw materials and supplies must be kept on hand but certain rules should be adopted to hold supplies within maximum and minimum quantities, as excessive stocks mean money uselessly tied up; and insufficient stocks may mean shutdowns, hurried purchases, and rush deliveries at extra expense. A good stock control system will take care of this question.

Scrupulous weighing, inspecting, and testing of all incoming materials and supplies is absolutely necessary. All weights must be checked against the shippers' invoices and specifications. No reputable vendor will deliberately short-ship; but "to err is human," and a check-up is merely a part of regular routine.

A mill that buys its sulphite should equip its laboratory with testing apparatus to determine the air-dry contents of the shipments. Incoming bales of rags also should be tested for quality and excess tare; and claims should be registered at once to give the shipper a chance to investigate.

Adequate storage facilities, properly located, are important factors in economical plant management. Spoilage and deterioration of materials means waste. Filler, starch, and similar commodities, when stored in damp places, draw moisture, get hard, and thus become inferior or even unfit for use.

Pulp and rags never should be stored in locations where they will mold or rot and as a consequence be thrown away. If used, such material will, of course, affect the quality of the finished product.

Not every paper mill has storage space adjoining the place where a given material will be used. It may be difficult to avoid excessive intrafactory handling and transportation, but there is always a chance to rearrange certain floor spaces for storing materials near to their final destination.

In the preparation of half stuff, certain routine methods should be

carried out. Rotary boilers must be inspected to make sure of proper steam circulation, and gauges must be in perfect order so that the rags will be cooked at the right pressure. For the various grades of rags, a mill should use standard processing chemicals and employ standard cooking procedures.

Washer rolls and bedplates must be kept in good repair if half stuff is to be properly prepared in a minimum of time. A uniformly defibered half stuff is instrumental in obtaining a better beater stock and in shortening the beating time.

Drainers used for storage of half stuff should be inspected at regular intervals. Brick walls always must be in perfect condition. Mortar or pieces of decayed brick in the half stuff spoils the paper. Beaters must be kept clean. Rolls and bedplates must be kept in perfect condition.

In a rag mill, the inside of the beaters often become coated with a residue of certain chemicals used in the impregnation of rags. This film should be removed regularly in order to prevent paper stock contamination. Investigations have shown that a moderately hot beater stock (say a furnish for 25 per cent or 50 per cent rag paper) will not loosen the film. On the other hand, a 100 per cent rag furnish with required long hours of beating and resultant high temperature (100 to 115 Fahr.) of the stock will remove the residue gradually, thus causing specks in the paper. There are preparations on the market for the removal of such residues.

Paper machine dryers must be checked at regular periods to insure uniform and adequate drying. Rolls must be crowned, and piping systems kept clean. If paper is dried to a uniform moisture content, subsequent operations are aided and the process of printing is facilitated. Co-operation with the printer permits the development of standard figures for the required moisture content for various types of paper.

Speed regulators are instrumental in obtaining maximum production and uniformity of product. Tear-outs must be flagged and poor lots so marked and put aside. This practice helps considerably in performing the finishing operations.

Aside from the physical condition of the paper machines, for which the superintendent and machine tenders are held responsible, proper planning and laying-out of orders has a marked effect upon final results.

Orders must be arranged to insure maximum deckle. Likewise, orders including the same colors, the same sizes and the same weights must be put together to obtain longest possible runs without wash-ups and changing of deckle and weights. Small runs of two or three beaters are expensive.

Calendering is one of the most important operations in finishing the paper. If maximum results are to be obtained in this operation, the rolls should be perfect and the paper of the proper moisture content.

The highest production of cutters is obtained by loading them to capacity. Rolls must reach the cutters with breaks flagged, in uniform diameter, and evenly wound. Layboys must have an attendant if the operator is to be free to run the machine efficiently and with the least trouble.

Sorting, which represents one of the final and one of the most important operations, must be done with utmost care. The customer is the ultimate judge, and a satisfied customer means repeat business and pleasant business relations.

Sheets showing strings, lumps, and cutter wrinkles—to mention just a few defects—have to be removed in sorting. Strings and lumps spoil printing plates. Half sheets or smaller pieces also must be sorted out as they interfere with the smooth running of printing presses.

Likewise paper must be trimmed to size and must be absolutely square. Cutting knives have to be sharpened frequently to avoid sawed edges.

A control slip inserted between adjacent reams affords a good check on the sorter or inspector. The slip should carry the notation: "This paper has been inspected by . . . . . If found defective, please return to us (Name of company)."

A rag content paper should be put up in a strong and nicely colored wrapper and the package labelled carefully. A well-designed label will enhance the appearance of the package.

Poor wrappers and careless handling of packages in the stock room cause much unnecessary waste in many mills. Repeated handling tears a poor wrapper.

Paper storage rooms always should be of even temperature. Windows must be provided with shades (preferably blue) to prevent fading of wrappers. Stock room employees have to be educated to move the oldest lots first. It is advisable to stencil packages with lot numbers indicating date of manufacture. Thus an easy control can be exercised and old lots will be shipped before new ones.

An intelligent turn-over of stock items, that is, using lots in order of their manufacture, will effect quite a saving in the course of a year.

Paper must be stored on platforms to facilitate handling of stock items, to insure cleanliness and to eliminate waste through breaking of wrappers. These platforms should rest on blocks about six inches high to permit sweeping of floors. Grades, sizes and weights, as well as colors should be piled up separately and individual piles or rows marked accordingly.

Shipping containers should be of a quality to insure safe delivery of contents. Although most of the fine papers are today forwarded in cartons, many shipments are still made in wooden cases. A good casemaker carefully measures and selects boards for respective sizes of containers. A poor casemaker is known by the quantities of "kindling wood" he accumulates. A considerable percentage of such waste can be eliminated.

Boxboards should be bought in various lengths and widths and properly dried.

Cases must be made to proper size so that the contents will not slide back and forth and thus damage the wrappers as well as edges of the paper. They must be lined, too; otherwise, the paper will be affected easily by temperature and humidity changes from without.

The maintenance and repair department of a mill plays an important part in the reduction and elimination of waste. While the operation of this department is influenced largely by breakdowns and accidents, a careful analysis of its functions will show that preventive maintenance can become very practical. The adoption of a definite routine will aid production and stop many leaks.

Close co-operation of the maintenance department with all other departments is a prerequisite to effective maintenance work. Foremen of the individual departments must assist the master mechanic by bringing to his attention all irregularities on machines and equipment. In this way, many costly breakdowns and delays can be prevented.

Periodic inspection is necessary to safeguard buildings and equipment. The frequency of such routine work depends upon the type and condition of the buildings and equipment, and the wear and tear to which they are subjected.

Shutdowns caused by low water, lack of orders, etc., afford good opportunities to make thorough inspections. Sundays, commonly, are busy days for the repair gang, but work done on Sunday must be planned ahead. In order to keep repair costs at a minimum, it is necessary to order materials and supplies in time so that

they are on hand at the beginning of a job.

Waiting for materials and tools, or looking for them when they are not at hand, are causes of many small leaks and expense. Breakdowns must be attended to at once. On such occasions, a well organized and trained repair gang will demonstrate its effectiveness and capacity as an economical factor within the organization.

Lack of proper lubrication has caused many a breakdown and accident. Therefore, a good oiler, who takes his duties seriously and attends to them with clockwork precision is a valuable asset to any mill.

The reduction of the annual oil bill is effected by the selection of the right grades of lubricants, methodical lubrication, and economical handling and reclamation of lubricants. The selection of proper lubricants is comparatively easy. Upon request, practically all oil companies will send their research engineers to plants for thorough investigations and subsequent recommendation of the right lubricants.

Here, as in the purchase of rags, the intial cost is not always the decisive factor. A poorly selected, cheap oil may prove more costly in the end than the most expensive grade.

Oils should be transferred to storage tanks whenever delivered in wooden barrels. Otherwise, there is waste from leaks or contamination with dirt or other extraneous materials.

Used oils become contaminated with residues, such as metals, carbon, etc. Therefore, a filtration system should be installed to make such oils fit for reuse.

Lubrication records should be kept, and any abnormal consumption of lubricants should be investigated and corrected.

For effective control of all repair and maintenance work, the management should supply the master mechanic with job cards. These cards should show the date, the number of the respective piece of equipment, the time spent on the job, and any supplies that may have been used and taken from stores.

Since expenditures for repairs and maintenance are part of production costs, their proper distribution is necessary to determine correct departmental rates. Furthermore, the management should supply the master mechanic with individual record cards containing a description of every machine and piece of equipment, its manufacturer and date of installation. The front side of the card should include all of this data, while the reverse side should be ruled for the entry of data covering repairs and improvements.

Such a record serves a twofold purpose: (1) it furnishes a complete record of the cost of maintenance of the specific item and (2) determines its real value. It may happen that a certain piece of equipment continuously requires excessive repairs. In such a case, the management might find it more profitable to junk the machine and buy a new one.

High coal prices and the increasing difficulty in obtaining fuel oil, plus increasing difficulties in transportation, demand rigid power plant economy. While it may be impossible (for the duration) to secure auxiliary equipment such as automatic stokers, coal and ash handling machinery, etc., mills without such equipment may find a way to reduce expenses by studying their individual problems.

Coal must be bought to suit the boiler plant, that is, according to analysis. It is important to watch B.t.u. value, percentage of moisture, fusion point and ash.

Lubrication, water softening and inspection of masonry must always receive proper attention. There should be no uncovered or defective pipes in a steam system. Proper insulation pays for itself in a comparatively short time.

TIME

Poor organization of labor and operations is another source of continual losses. Excessive labor turn-over not only means waste but it lowers efficiency and curtails production.

New employees have to be trained. Under present conditions it will not always be possible to find the right man for the right place. Mills do not have the choice they have experienced in normal times; therefore, more patience and understanding are needed to break in a new employee.

Today, more than in the past, a foreman must be more than just a boss. He must be able to train the new man and make him understand that no matter how obscure his job he is part of the organization and should contribute to its welfare.

Quality and production both suffer from frequent changes in personnel. To acquaint a new employee with his duties means a considerable expenditure of money.

Quite naturally, every wage earner expects the greatest possible money returns for his efforts. However, money alone does not make an efficient and loyal worker. He likes to know that his co-operation is desired and appreciated, and an occasional acknowledgment of his ability and commendation of his work go far toward instilling within him the ideals of team work. A steady job and a comparatively secure future likewise mean much to the average worker.

An analysis of nonproductive labor costs will reveal that the largest percentage of such costs must be attributed to handling of materials and circuitous intrafactory hauling. A system of conveying, properly applied, should link the various processes, and handling routine should be made as nearly automatic as possible.

Adequate lighting is one of the most important factors in economical plant operation. In a properly lighted mill, there will be less spoilage, less inaccuracy, less wasted materials and fewer accidents. A worker cannot do his work efficiently, if he is hampered by poor lighting.

Waste through poor planning can be reduced by coordinating all functions and transactions within the organization.

Purchases, production and sales can be planned ahead and laid out in respective budgets. Budgetary control will not increase sales or profits, but it will be a guide to management.

Weekly running schedules, programs for the repair and maintenance department, a follow-up system and stock control will take care of details and insure smooth and efficient operation.

One of the most important and humane factors in the elimination and reduction of waste is organized safety work. The annual loss of human life and lost man-hours represent an appalling picture. Accidents in the United States in 1941 killed about 50,000 workers and caused the loss of 480,000,000 man-days. (*These figures were released by the National Safety Council in connection with its War Production Fund to Conserve Manpower. This movement, recently launched, is a national-community plan of action against accidents, and it has been widely publicized in most of the leading magazines.*)

Management, superintendents and foremen are responsible for safety education. Bulletins and safety committees alone will not serve their purpose fully unless accompanied by individual instructions, and personal contact with employees should never be neglected. Many accidents may be attributed to carelessness and the take-a-chance attitude. The careless employee is sure to be an accident victim regardless of the safeguards installed to protect him.

Effective industrial safety work and the elimination of waste through acci-

dents rest upon a true understanding of three fundamentals: (1) safety devices, (2) methodical inspection and (3) safety education. In safety work, as in other industrial work, results depend in a large measure on teamwork and co-ordinated endeavor.

Most industrial accidents can be eliminated if management makes every effort to educate the employees in safe practices.

ADMINISTRATIVE WASTE

Standardization of products and elimination of non-essential items are necessary, not only for the duration, but for the future welfare of an enterprise. In the fine paper industry, there have been frequent repetitions and duplications of grades, items, sizes and weights. Much has been done in the past few years to simplify the lines and products, but there still is much to be accomplished.

Sales and advertising problems can be solved by proper market analysis and by methodical study of supply and demand.

Establishment of quality standards and of proper channels of distribution will help sales and will maintain pleasant relations between manufacturer and consumer. The wants and needs of the buyer must be studied. The least expensive way to deliver the goods must be found in order to render the purchaser as economical a service as possible.

A basic, dependable cost accounting system is indispensable to the success of any enterprise. A cost department should not be considered as an agency for the collection of manufacturing expenses and a depository of figures, but rather as an information center and a means of controlling operations.

It is quite evident that the collecting of initial figures plays an important part in the determination of true costs. Without accurate intial data, the whole system is valueless. To get results, plain and understandable forms adapted to the individual requirements of the mill are the main requisite.

The forms must be comprehensive to the man in the mill. Because of his practical knowledge of operations, production, and materials, he can do much toward making the cost system a success.

For better co-operation among departments and to keep the foremen informed of their progress, certain cost data should be distributed to them. Statistics showing comparative production and incurred expenditures (wages, cost of supplies for a certain period, etc.) probably will be sufficient to keep them posted about their individual activities and results.

Changing conditions make it necessary to analyze records from time to time, thus avoiding errors or incorrect information. If carefully kept, properly interpreted and applied they facilitate operations and ultimately effect the elimination of waste.

Material control is an indispensable adjunct to an effective cost system and is a factor that should receive wider recognition and consideration in fine paper mills. It stops or reduces leakages, pilfering and wastage of materials. It makes employees conscious of the need for carefulness and economy. It is a means of keeping a well-adjusted supply of materials on hand, and, if properly kept, it will do away with the taking of physical inventories periodically, or will reduce them to a minimum.

There are hundreds of other ways and means of reducing waste and effecting economies in fine paper mills. This resumé on the elimination of waste is intended merely as a reminder, and as a contribution toward winning the War.

Dismounting of Worn-Out Pulpstones

BERNARD BORNSTEIN, Technical Adviser
Pulpstone Division, Norton Company

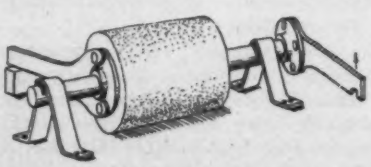
▶▶▶ THE REMOVAL OF SHAFT AND FLANGES from a discarded pulpstone has never been a pleasant task. The job has become even more aggravating since the introduction of the artificial pulpstone.

It is only natural to take pride in producing low stone cost figures. To do so requires that a stone operate over a period of years; and, generally speaking, the longer that a stone operates, the greater the difficulty in removing it from the shaft.

The problem appears to be one of confusion and contradiction. Some small mills with inadequate equipment have practically no difficulty in removing stones that have been in service for eight to ten years. Other mills, with much better facilities and approximately half this stone-life, have considerable difficulty.

One of the cleanest groundwood mills in the country, where the water supply is kept close to neutral, has never been able to remove a stone without burning out a bushing or actually chipping out the stone. Another mill, having practically identical conditions, takes off flanges with comparative ease.

Due to the acidity of the white water, Pacific Coast mills use stainless steel for shafts and flanges. Although stainless steel greatly increases the life of these items, it does not follow that they are always easily removed from a pulpstone.



Scheme used for removing flanges from worn-out pulpstones.

Corrosion of threads causes flanges to freeze on the shaft. To help check this corrosion, such substances as graphite greases, tallow with beeswax, red lead and gun putty have been and are being used on the threads. Each of these substances have been used by some mills with good results. Many more mills have used all of them plus a few more with indifferent results. One suggestion that appears to have merit is the use of a sleeve (which is fastened to the flanges) to cover the threads.

Some years ago, a large Canadian

(Concluded on page 1229)

Minor By-Products of the Pulp Industry*

LOUIS ELSBERG WISE
Institute of Paper Chemistry

▶▶▶ IN VIEW OF THE WIDESPREAD attention that has been accorded lignin and vanillin produced from it, a discussion of certain of the minor by-products of the industry may not be amiss. They form a motley crew, a few members of which have been known for many years. Despite their venerable age, they are still interesting and exciting—and in these days it is always possible that an erstwhile museum piece may develop into a useful industrial product.

Let us start with an old friend which for years has been termed "sulphite liquor lactone." This compound was first isolated from sulphite waste liquor by those pioneer investigators Lindsey and Tollens (*1*) in 1892. They simply extracted a crystalline material from spruce sulphite waste liquor, but they failed to analyze or characterize the substance. About thirty years later the same compound was isolated by Holmberg (*2*) and was then thoroughly studied. The yields were never impressive. Holmberg obtained about 200 milligrams of the substance from each liter of waste liquor.

After recrystallization, the substance was shown to have the molecular formula $C_{20}H_{20}O_6$. It melted at about 250 C. and was obviously the lactone (inner ester) of an optically active acid, $C_{20}H_{22}O_7$. The lactone could be acetylated and methylated, and a study of these derivatives showed that the original lactone contained two hydroxyl groups. All in all, the methylated compound contained four methoxyl groups, two more than were found in the parent substance. Holmberg also showed that the sulphite liquor lactone could be sulphonated and brominated. Evidently it contained aromatic nuclei.

The original lactone, on treatment with sodium ethylate, yielded an isomer, melting at 210-211 C. The fully methylated lactone could also be isomerized on heating. On the basis of these fragmentary but important data, Holmberg tentatively ascribed alternative formulas to the lactone, which were later shown to be incorrect. They are reproduced in Figure 1.

Within the past ten years it has been shown that the occurrence of sulphite liquor lactone is not limited to sulphite liquors. It is found in a number of coniferous pulpwoods. In 1932, Kawamura (*3*) isolated the compound from Japanese hemlock wood (*Tsuga sieboldii*) and Emde and Schartner (*4*) in 1934 discovered it in Norway spruce. It was then given the more dignified name of *Tsugaresinol* or the alias *levo-conidendrin*. Both of these extractives were identical with the material isolated by Holmberg. The same substance was also found in tiny amounts in the heartwood of "matai" trees (*Podocarpus spicatus*), conifers growing in the highlands of New Zealand (*5*). The lactone was shown to be closely related to *pinoresinol*, a first cousin isolated from certain pines and from spruce. All of these natural products, the so-called "resinols" or "phenolic resins" were rechristened the "lignans" by R. D. Haworth (*6*). Every lignan contains two aromatic groups and two propane groups. This is characteristic of the lignans. The skeleton assigned to the sulphite liquor lactone is shown in Figure 2.

While there is no need to give all of the chemical reactions that led Haworth and others to arrive at the constitution of the lactone, a few fundamental data are of interest. In 1934, Erdtmann (*7*) found that if the dimethyl ether of the lactone was oxidized with hypobromite, two main products were obtained. These were *o*-veratroylveratric acid (Figure 3, A) and an optically active dibasic acid, $C_{22}H_{24}O_8$ (B). The latter could be dehydrogenated by the use of selenium or of lead tetraacetate and converted into another acid $C_{22}H_{20}O_8$ (C). The latter was synthesized by the dimerization of 3,4-dimethyoxypropiolic acid (D) with acetic anhydride (*8*). This synthesis is entirely analogous to that of Michael, who thus dimerized phenylpropiolic acid to form 1-phenylnaphthalene—2,3-dicarboxylic acid. All of these reactions are shown in Figure 3.

The positions of the free phenolic groups in the original lactone were determined by Haworth (*8*) by its conversion to the diethyl ether. This ethylated product was then oxidized with permanganate. The resultant substance was one already prepared by Vanzetti and Dreyfuss (*9*) and had the structure shown in Figure 4.

If the original lactone is converted into its dimethyl derivative and then *directly* dehydrogenated with selenium or lead tetraacetate, four hydrogen atoms are removed and an inactive lactone (melting at 215-216 C.) is formed. This becomes a valuable reference compound and it was finally synthesized by Haworth (*5*) in the following way. Veratraldehyde was

(*) Based on a lecture given before the North East Wisconsin Section of the American Chemical Society.

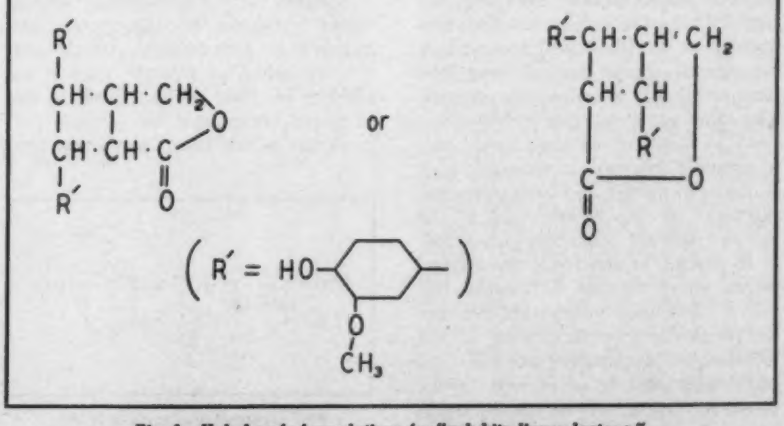


Fig. 1—Holmberg's formulations for "sulphite liquor lactone."

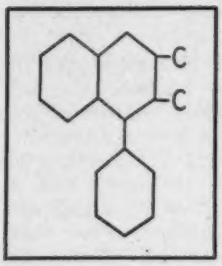


Fig. 2—The skeleton of sulphite liquor lactone.

condensed with sodium β-(3,4-dimethoxybenzoyl) propionate in the presence of acetic anhydride, Figure 5 (A). This modification of the Perkin reaction was discovered many years ago by Borsche. The resulting acid condenses almost quantitatively with an alkaline formaldehyde solution to give the beta-methylene derivative (Figure 5, B). This in turn reacts with hydrochloric acid in glacial acetic to form an addition product with ring closure (Figure 5, C), and from this is obtained the reference lactone—(D)—identical with the compound prepared by methylating our friend the sulphite liquor lactone and then dehydrogenating it. These various steps are shown in Figure 5.

These reactions, while they are not entirely conclusive (together with certain other experimental data obtained by Haworth) make it highly probable that the chemical constitution of the sulphite liquor lactone is that shown in Figure 6.

The question now arises: "Why all this fuss about a compound the yields of which are of the order of three pounds per ton of sulphite pulp? It has no immediate industrial significance. It is just a scientific curiosity. Why bother with it?"

Whether or not this lactone should be considered important depends entirely on one's point of view. It belongs to the class of lignans all of which contain two C_6C_3 units in their chemical makeup. In all of them the normal propylbenzene grouping occurs. This same group occurs so frequently in the plant kingdom and in the animal world that its repetition presumably has a certain significance. The same grouping (somewhat modified) is found in certain volatile oils, in anethole, eugenol, in cinnamic acid. It occurs in the red and blue anthocyan pigments of the flowers and in the yellow flavonol pigments in wood. It is present in coniferin, the characteristic component of the cambial layers of coniferous pulpwoods. A similar structure appears to exist in the industrially important catechus and phlobotannins. It is present in the proteins. It occurs in certain drugs like ephedrin.

It would be unwise to stress this point too far, but it appears that this wide distribution of the *n*-propylbenzene grouping is no mere accident. The wide occurrence of the lignans themselves, in unrelated plant families, seems to indicate that they play some role in the metabolism of the plant, and so the painstaking investigations we have outlined are amply justified even though there is no present day commercial application.

A word should also be said regarding the possible kinship of the lignans to lignin. The latter also contains the C_6C_3 grouping. This may be fortuitous, but it is so striking that it permits the thought that lignans may actually be involved in lignification. This idea is not original with the writer. It has been expressed by Vanzetti and also by Haworth (*6*). Vanzetti (*10*) in fact suggested that lignans may, under normal conditions, be the precursors of lignin, and, under pathological conditions, might give rise to certain resins.

sate when the digester pressure is relieved. Its origin probably is to be found in the terpene hydrocarbons of the essential oils of the original spruce wood, although this is not necessarily the case.

The yields of cymene are quite meagre. They vary from 1/3 gallon to one gallon per ton of pulp—and in European practice they approach the lower figure more often than they do the upper one.

Cymene, although it is the principal component of spruce turpentine, is not the only constituent. Dipentene, borneol, and sesquiterpenes are also present. Routala and Pohjola (*12*) made a theoretical attempt to explain the formation of cymene during the cook. The course of the reaction appeared to be:

α—Pinene→Terpineol→Terpinenes→ Cymene.

This would mean hydrolysis, dehydration, and dehydrogenation, with the bisulphite acting as dehydrogenat-

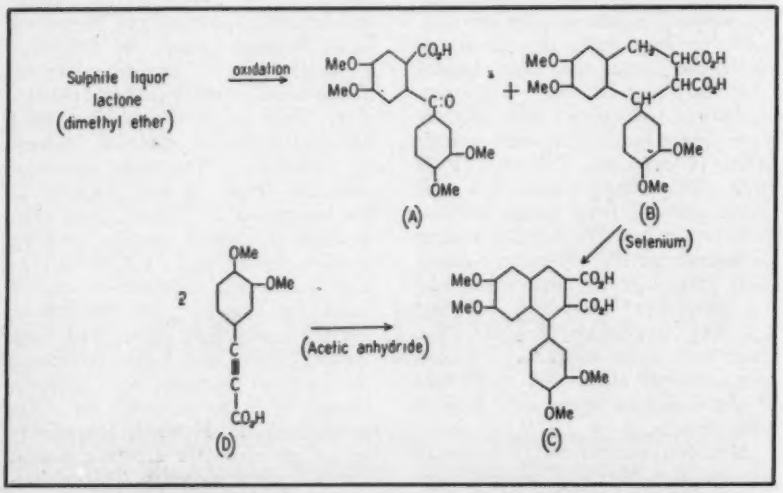


Fig. 3—Oxidation and dehydrogenation of the lactone dimethyl ether.

Another very old standby among minor products of spruce sulphite pulping is para-cymene, which was first identified as a waste product by Klason, in 1900 (*11*). This is the principal component of "spruce turpentine," which forms in the condening agent. The conversion, it was claimed, could not take place in the absence of the wood. There is no assurance, however, that some of the cymene may not be present in the original spruce wood. Heuser, Zeh, and Aschan in 1923 (*13*) hydrolyzed spruce wood and obtained cymene as well as α-pinene. Irrespective of its origin, cymene is a by-product of the industry. Can it be used? That is the important question, and it looks now as though the question might be answered in the affirmative.

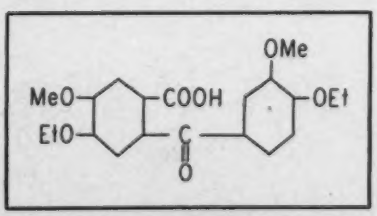


Fig. 4—Oxidation product of the ethylated lactone.

Many of the reactions of cymene have been known for many years and require little comment. Under certain conditions, the isopropyl group may be split off to form toluene, but the

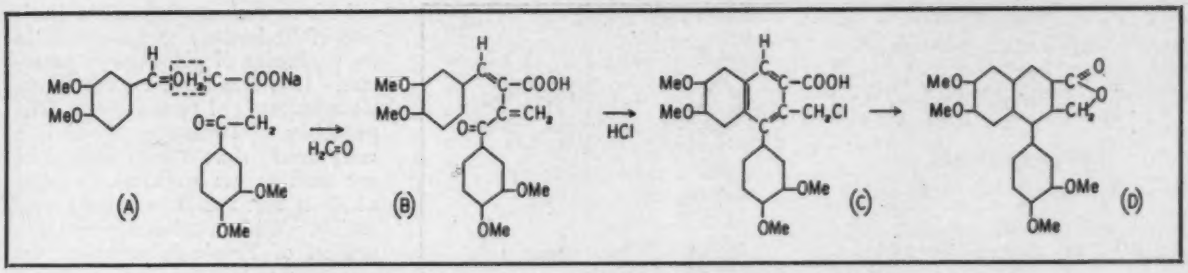


Fig. 5—Synthesis of the methylated, dehydrogenated sulphite liquor lactone.

method is not a commercial one, and we need not expect the production of T.N.T. from cymene. More recently, however, the nitration of cymene has been studied and nitrocymene may be obtained in excellent yield. This can be reduced to the aminocymene, which is also termed carvacrylamine, a compound which has been used as an antiknock for motor fuels in the U. S. S. R. and elsewhere (*14*). The conversion of cymene into carvacrol has also been effected. The latter can be made from cymene sulphonic acid by alkaline fusion, and has been used in medicine. Cymene may also be converted into thymol, which is an excellent antiseptic, and far less toxic than carbolic acid. It is also used as an anthelmintic agent (i. e., in destroying tapeworms). However, the thymol synthesis from cymene is not very satisfactory (*15*), and this presents a challenge to the chemist—since thymol, and its hydrogenation product menthol, are in great demand today. The relationship between cymene, carvacrol, thymol, and menthol are shown in Figure 7.

Menthol is an important component of peppermint oil, which is quite scarce at present.

The oxidation of cymene was studied long ago. Chromic oxide acting on cymene yields terephthalic acid. Aqueous nitric acid gives rise to paratoluic acid. A more recent oxidation, however, generates cumic acid, a reaction which will be referred to somewhat later. Before discussing this, we should switch the scene to another industry, a digression which may be justified on the ground that it has a bearing on the chemistry of cymene. So let us refer briefly to the recent developments in wood turpentine.

If pine stumps are removed from the soil and chipped, and then extracted with gasoline, a number of compounds are removed. One of these is pinene, but there are also present other volatile monocyclic terpene hydrocarbons, the so-called menthadienes. The structures of three of these are shown in Figure 8.

If the right catalyst is added to this mixture of terpenes, an interesting disproportionation reaction takes place at the boiling point, and there is a concomitant hydrogenation and dehydrogenation, with the formation of two parts of cymene to one part of p-menthane. The catalyst is a mixture of copper and nickel formates. Small amounts of this catalyst added to the terpenes boiling under reflux condenser effect this conversion. This process was patented in 1940 by Palmer and Bibbs (*16*). Thus another potential source of cymene has been developed in the wood turpentine industry. But the reactions apply equally as well to cymene obtained in the sulphite digestion.

The oxidation of cymene to cumic acid gives a product analogous to benzoic acid, which it is claimed may be used in its stead (*17*). The conversion may be carried out under very mild conditions. A mixture of anhydrous manganese and lead acetates is suspended in the cymene and air blown through the suspension at 30-50 C. Even at the lower temperature, a 40 per cent yield of cumic acid is claimed. The acid can be removed from the reaction mixture with alkali, precipitated with acid, and readily recrystallized. This interesting oxidation is outlined in Figure 9. This same figure also shows other oxidations as well. The first of these is dimethyl tolylcarbinol. The exact conditions for this have not been published, but there is a patent pending. Apparently this too is a liquid phase, carefully controlled catalytic oxidation. This carbinol is not stable. When heated, at its boiling point it loses water readily and passes into p-methyl-α-methyl styrene, which is a very intriguing substance. When heated alone it does not polymerize, but it copolymerizes when heated in admixture with styrene or other readily polymerizable compounds like the dienes. In this way it becomes a potential raw material for synthetic resins. If this methyl styrene is oxidized further, it gives methyl tolyl ketone (methyl acetophenone), a fragrant, colorless oil boiling at 225 C. This is the first time that it has been produced in quantity, and it is now available as a soap perfume. On hydrogenation, the ketone is converted into the corresponding secondary alcohol—methyl tolyl carbinol. This in turn may be dehydrated to give vinyltoluene (methylstyrene) a homolog of the important compound styrene, which it resembles very closely in its properties. It, too, polymerizes very readily (alone) to form tough, colorless resins. The thought suggests itself that since styrene itself is used in the production of Buna rubber, possibly the new methyl homolog might serve in a similar capacity. In any event it has commercial possibilities. This series of reactions is outlined in the recent article by Palmer (*17*), from whose work Figure 9 is taken. They are interesting to the pulpmaker since they apply to one of his by-products as well as to the cymene obtained from the "lightwood" of Southern pines.

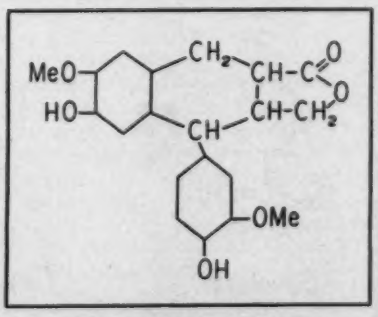


Fig. 6—Formula for the sulphite liquor lactone.

Sulphate turpentine deserves a brief mention at this point, since yields of 10 kilos per ton of (pine) sulphate pulp have been reported (*17a*). If this report is accurate, the United States, with its rapidly expanding sulphate pulp industry, should be able to produce over 45 thousand tons of this by-product per annum. Up to the present only a fraction of this amount has appeared in the market.

Sulphate turps is very different chemically from sulphite turpentine. It bears a much closer resemblance to ordinary wood turpentine, containing

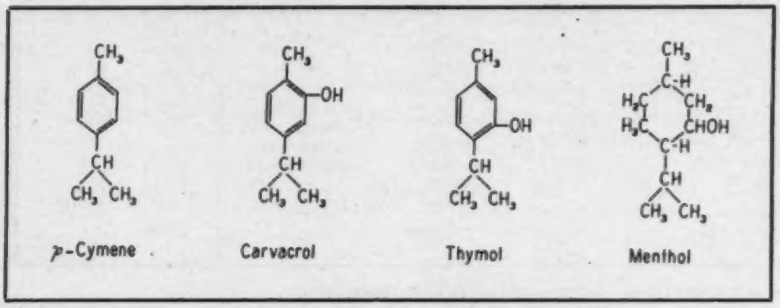


Fig. 7—Cymene and its relatives.

as it does largely alpha-pinene, together with smaller amounts of beta-pinene, and probably some dipentene as well (*17a*).

The patient reader, however, would probably like a few more significant by-products—the tonnage of which is somewhat greater than that of sulphite liquor lactone, or sulphite, or even sulphate turpentine For his benefit let us examine an interesting development in Europe that has been taking place in the plants of the Phrix Corporation. The principles used are not new, but their application is extremely suggestive. The Phrix Research Laboratories, in Germany, which are closely coordinated with their mills, have studied the conversion of wood, straw, and other raw materials into high alpha dissolving pulps used largely in the rayon industry. The pulp mills are directly connected with the staple fiber plants, and the basic idea has been to integrate all steps from the raw material to the finished rayon, and to deal with these as stages in a unified plan for the full utilization of the raw materials, and with the elimination, as far as possible, of waste products. Let us take rye straw as a typical example. This material is very high in pentosans. It is subjected to a carefully controlled, mild acid prehydrolysis, with 0.5 per cent —1.0 per cent sulphuric acid at 120-130 C. for 2 hours. The hydrolyzate contains large amounts of xylose, which, on evaporation of the neutralized solution under diminished pressure, may be recovered. On the other hand, if occasion demands, the xylose can be converted into furfural by heating with acid. The most promising product, however, is the so-called "fodder yeast." Actually the microorganism that grows on the hydrolyzate is not a true yeast at all. It is a "pseudo-yeast," *Torula utilis*, which can live effectively on xylose, provided suitable nutrients like ammonium sulphate and inorganic phosphates are added to the dilute hydrolyzate. In this way 100 parts of sugar may be changed into about 50 parts of *Torula utilis*, of which approximately 50 per cent is nutritious protein. It is even claimed to contain the vitamin B complex.

The Phrix mills have the capacity of turning out twenty thousand tons of compressed pseudo-yeast per annum! This may be used for fodder—but it can also be used for human consumption since it seems to contain slightly more protein than does true yeast, with which it may well enter into competition. [It is interesting to note (parenthetically) that recently the United States Bureau of Agricultural Chemistry (*18*) has suggested the production of *Torula utilis* in this country from the press juice of cannery dehydration plants in Florida.] The residue from the prehydrolyzed rye straw, after thorough washing, is cooked by the sulphate process and gives a pulp containing 92-93 per cent alpha cellulose, with the retention of only 2-6 per cent xylans. The original raw material contained 25 per cent xylans, most of which were converted into "yeast" (or other products mentioned above). The complete removal of xylans proved to be impracticable and all such attempts led to degraded cellulose. This is an old story.

The work of the Phrix Corporation has been described quite recently by Jentgen (*19*) and Dörr (*20*), but the fundamentals on which the work rests depend on the researches of Dr. Heuser, two decades ago, and of Dr. Jayme and his co-workers (*21*) at the Institute of Technology at Darmstadt in the production of pulps low in pentosans. It is also based on the microbiological work of Lechner (*22*). The possibility of fermenting xylose is a lucky break, since *Torula utilis* does not seem to use arabinose (a sugar which is first cousin to xylose) very readily. While alcohol appears as a product of *Torula* fermentation, the amounts are evidently lower than in the case of the true yeasts.

In contrast to the Phrix culture of *Torula* is the production of these true yeasts — *Saccharomyces cerevisiae* by the Heijkenskjold method. This has been done on a large scale in Sweden, and more recently in the Liverpool mill in Nova Scotia (*23*), and in certain mills in Canada. Not long ago the author consumed a small sample of such "bakers yeast"—prepared from sulphite waste liquor—and found it very palatable.

In its production, the hot waste liquor is treated under aeration with sufficient lime to bring the *p*H to 6. The settled liquor is then cooled to 28-30 C., molasses is introduced to bring the sugar content up to 3-5 per cent, and subsequently malt sprouts and seed yeast are added. The inorganic nutrients are ammonium acid sulphate and ammonium phosphate or superphosphates and ammonium sulphate. In the production of 1-2 tons of fodder yeast, air is supplied at the rate of 2,000 cubic feet per minute.

This is the same yeast that was suggested recently as the starting product for making d-ribose the pentose sugar required for the synthesis of riboflavin, which is another name for Vitamin B_2. This was outlined by Dr. Kamlet at the last meeting of the American Chemical Society at Buffalo before the Division of Medicinal Chemistry. The yeast obtained by the Heijkenskjold method from sulphite wastes was suggested as an inexpensive source of raw material. From 1.2 to 1.67 kilos of compressed

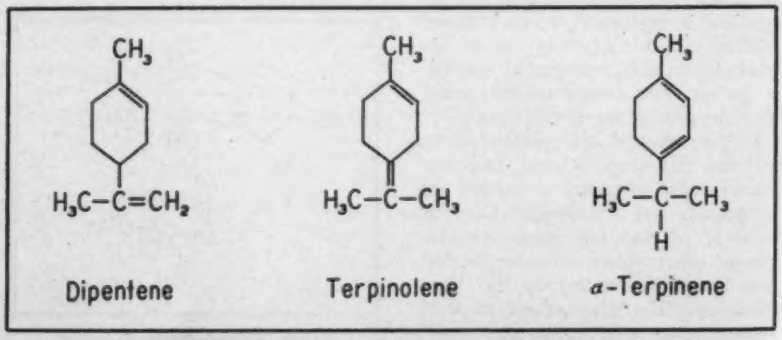


Fig. 8—Monocyclic terpene hydrocarbons in pine wood.

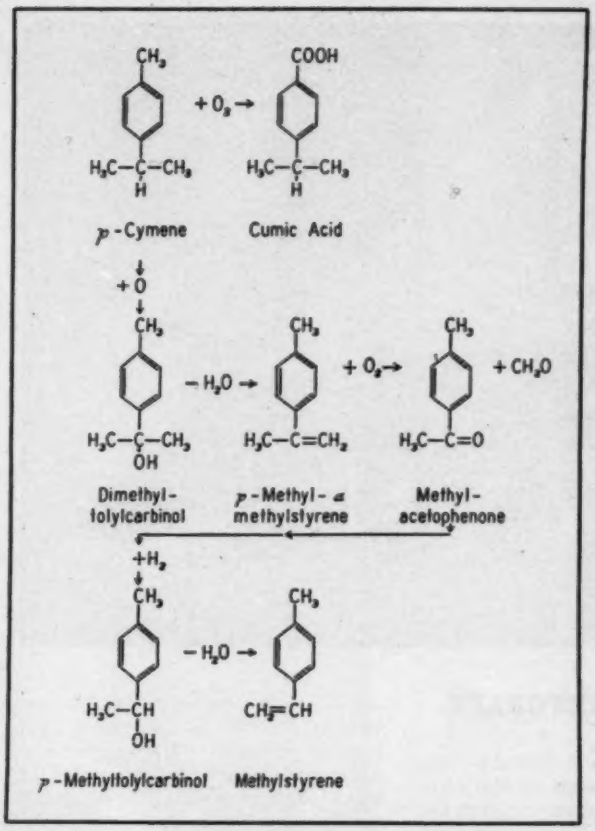


Fig. 9 — Oxidation products of cymene, taken from data given by Palmer.

yeast were required to give one gram of ribose. Nucleic acid is first formed from the yeast by Bowman's method (*24*), and this is converted to d-ribose by the recent Phelps process (*25*). Yeast protein, adenine, and guanine are potential by-products. The fact that an important intermediate in the production of an essential vitamin can be grown on a waste liquor is interesting to say the least. The reader will understand, of course, that ribose is *not* originally present in the liquor. It is a hydrolysis product of the yeast cultured in the way that has been outlined.

Another recent development in sulphite waste liquor fermentation stems from the University of Wisconsin (*26*). It involves the use of anaerobic bacteria, and has not been exploited commercially. The organism, *Clostridium butylicum* causes a very rapid fermentation of the sugars in the liquor to butanol and acetone, both of which are valuable solvents. Ethyl alcohol is also formed in very subordinate amounts. The chief toxic factor cramping the style of the bacterium was shown to be sulphur dioxide. By adding lime to the waste liquor until the *p*H reached 10.5, calcium sulphite was precipitated. This was followed by the continued addition of lime until a *p*H of 12.5 was reached. This precipitated a large amount of lignin sulphonates. The filtrate from these was then cautiously acidified with sulphuric acid (with or without the preaddition of sodium sulphate) so that the liquor had a *p*H of 5.8. In this way calcium sulphate was removed by precipitation. To the filtrate from this, suitable nutrients and innoculum were added. The total amount of sugar fermented was 75 per cent of the amount present. The yields of the neutral solvents obtained were about 25-30 per cent based on the weight of the sugar fermented. They were formed in the ratio of 75 parts of butanol, 20 parts of acetone, and 5 parts of ethanol. The fermentations were rapid and complete within 50-60 hours.

These are just a few examples of the work of microbiologists and chemists with minor products of the pulp industry. Some of them are important at present only from an academic and purely scientific point-of-view. Some of them have a limited industrial application. Some of them are "in production." To the author, all of them —and others which have not been mentioned, are extremely interesting. Let us hope that he has shared this interest with the reader.

Acknowledgment — Grateful acknowledgment is made to Miss Edna K. Nihlen for the figures included in this article.

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Hand-Stain Remover for Chemical Workers

▶▶▶ THE DETERGENT, solvent and other beneficial qualities of glycerine are utilized in the following chemical stain remover recommended by *Photo Art Monthly*. Suggested especially for photographer's hands, this preparation is, obviously, of value also to other workers with chemicals.

Water	8 oz.
Soap powder (a good grade)	4 oz.
Silica (150-mesh)	½ oz.
Pumice flour	¼ oz.
Chlorox	1 dr.
Glycerine	1 oz.
Rubbing alcohol	1 oz.

Heat the soap in the water until dissolved, and add the abrasives. When cool add the Chlorox (or the like), the glycerine and alcohol.

Bottle and use in the same way as any liquid soap on well-wetted hands.

This preparation is said to remove most chemical stains that result from dark-room procedures. Acid stains, it is pointed out, are really not stains, but burns and these require time for their eradication.

—from *Glycerine Facts*

▸▸▸ VITAL TO ALL MANUFACTURERS is the conservation of manpower, and perhaps the first major problem to be met in working toward this goal is the reduction of lost manhours to a minimum. In wartime, however, with industry operating at top speed and employing much new and untrained help, the curve of lost time due to accidents is likely to go up.

Accidents do happen in the paper industry in spite of safety education, well-organized safety programs and precautitons, and they probably will happen more often now than in peacetime. Therefore, the scope of first-aid education should be broadened to meet present emergencies and future eventualities.

First-aid training in the paper industry long has been given by lecturers, demonstrations, and textbooks. It has been customary to have these methods handled by trained nurses or physicians. However, a new and efficient adjunct to industrial first-aid training has been made available through a basic visualized course designed to speed up this training and to effect a broader knowledge of first aid in the present emergency.

This course includes films, recorded lectures, textbooks, and actual demonstrations. There is a series of 20 separate 35 mm. slidefilm subjects (two in technicolor). Each film is accompanied by a lecture (on disc record) and a printed textbook. Each lesson also is "cued" for practical first-aid demonstration on the spot, using a live model.

LYNE S. METCALFE

This series of films does not represent a complete course for the average paper-mill employee in first-aid emergency procedure, but it does add visualization and synchronized sound to long approved methods of instruction. The course also is of inestimable aid to teachers who instruct in first aid. The use of the instructor's manual and the correlative textbooks, the visualization of certain procedures on the films, accompanied by professional recorded lectures, all combine to enable the teachers to conduct classes with more speed and greater efficiency. This, of course, means that more employees will gain a basic knowledge of what to do until the doctor arrives in the handling of any common emergency. To do the right thing in the shortest time is the aim of modern first-aid training, since, after all, the time element often determines the extent of the accident as well as the time lost by the injured employee.

First aid is the first step in any safety program and first-aid training in industry reflects advantageously in the home and community lives of all industrial employees in peacetime as well as in wartime.

The following subjects are covered in this series of slidefilms:

The Purpose of First Aid (55 pictures or patterns). A preview of the course, and some of its applications.

The Body—Part I (45 pictures, technicolor). Muscles, tendons, skin, blood, skeleton, head, trunk, upper and lower limbs.

The Body—Part II (54 pictures, technicolor). Heart, arteries, capillaries, veins, breathing, nutrition, and nervous system.

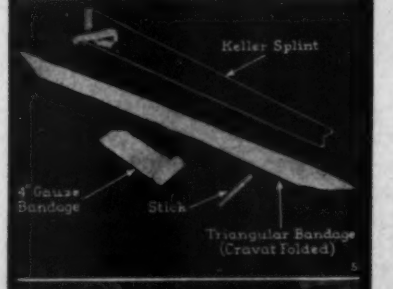
Shock (31 pictures). How to recognize and treat victims of shock.

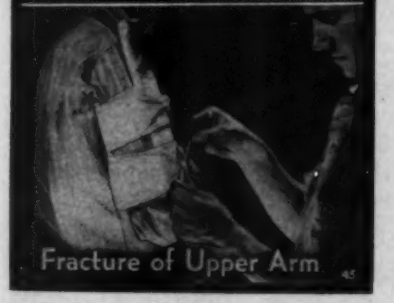
Unconsciousness (62 pictures). Due to such things as heat stroke, heat exhaustion, apoplexy, and fainting.

Common Emergencies (56 pictures). Appendicitis, choking, diarrhea, earache, toothache, common colds, sunburn, poison ivy, poison oak and sumac, insect bites, and fainting.

Minor Injuries (62 pictures). Strains, sprains, dislocations, bruises, frostbite, foreign bodies in ear, eyes, nose, and stomach.

Wounds—Part I (49 pictures).





How to stop bleeding and help prevent infection.

Wounds—Part II (57 pictures). Abrasions, clean-cut wounds, jagged or torn wounds, deep puncture wounds, animal bites, and snake bites.

Dressings and Bandages—Part I (75 pictures). Materials used in bandaging wounds, how to apply bandages.

Dressings and Bandages—Part II (77 pictures). Commonly used bandages.

Artificial Respiration (32 pictures). How to apply artificial respiration by the prone pressure method.

Burns (39 pictures). First aid treatment for burns and scalds.

Poison (39 pictures). Treatment of drug poisoning, food poisoning, and carbon-monoxide poisoning.

Fractures—Types (59 pictures). Two principal types of fractures, general first aid treatment, specific treatment for fractures of leg, fore-arm, upper-arm, elbow, finger, and collar bone.

Fractures—Treatment (56 pictures). How to treat fractures of skull, nose, jaw, spine, ribs, pelvis, thigh, kneecap, feet, and toes.

Fractures—Splints (64 pictures). Fixed traction splints.

Moving the Injured—Stretchers (47 pictures). Moving the injured on various types of stretchers.

Moving the Injured — Carrying (63 pictures). How to improvise a stretcher and how to carry injured when a stretcher can't be made quickly.

First Aid for Survivors (This picture to be released in the near future).

◆

Dismounting . . . Pulpstones

(Continued from page 1222)

mill began using artificial pulpstones. After a few years of service, the stones were still in splendid condition but the grinder bearings were not. Because of previous experience with natural pulpstones, the mill first suspected that the artificial stones were too heavy for the bearings. The mill, however, failed to consider that the average life of a natural pulpstone had been only about a year and that grinder bearings had been checked or lined up every time stone was taken out. The trouble actually was caused by the long life of the artificial stone. This characteristic of artificial stones also was responsible for severe corrosion of shaft threads which made the removal of a worn-out stone so difficult.

In order to minimize the trouble in removing the flanges and shaft from a worn-out stone, the majority of the mills now use a groundwood board gasket between each flange and the stone. The gasket is about $\frac{3}{8}$ in. thick. It compresses hard and will stand up for the life of a stone. Chemical fiberboard or plywood gaskets, on the other hand, will deteriorate.

At one time, a cement filling was popular as a gasket material, particularly in Canadian mills. Such a filling is now used by only a few mills.

One mill successfully uses a gasket of $\frac{1}{16}$-in. sheet lead.

The method commonly used for loosening flanges on a shaft carrying a worn-out pulpstone is illustrated in the accompanying sketch.

After removing the stone and shaft from the grinder, the shaft is bolted down to the floor through the use of a pair of simple yet sturdy holders, one for each end of the shaft. Then a pin or wrench is positioned on the flange to be removed; and an I-beam about ten feet long, to the driving end of the shaft. Such an I-beam, functioning as a lever arm, should turn the shaft, thus freeing the flange, when the lifting power of a 10 or 15 ton crane is applied at its free end. There have been many individual cases, however, where the tremendous force of the crane simply bent the I-beam without turning the shaft.

Mills using four-foot grinders usually are equipped with heavier cranes. In cases of this kind, it is possible to use a wrench so strong that it will turn the shaft even if the threads are stripped in the process.

Heating flanges before attempting removal, especially with the larger stones, has some supporters. One mill has found it advantageous to introduce steam at 100 lb. pressure for about an hour through a small hole in each flange before attempting removal. In this case, the space between stone and the face of the flange should be airtight. Usually, the flange holes are filled up with wooden plugs. These plugs not only keep out steam and water but also help to prevent wear to the sides of the holes.

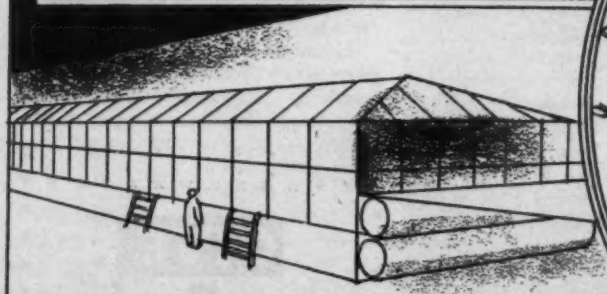
Although much thought has been given to this problem of mounting and removing pulpstones from shafts, there is yet definite need for an improved procedure in many cases.

GIVE
RED CROSS
WAR FUND

PAPER SKETCHES

UNSIZED PAPER COATED WITH A MIXTURE OF YELLOW PRUSSIATE OF POTASH, CHARCOAL, SALTPETER, CHLORIDE OF POTASSIUM, WHEAT STARCH, AND WATER WAS BEING USED IN THE 1890'S AS A BLASTING MATERIAL TO TEAR DOWN LEDGES AND BLOW UP BUILDINGS.

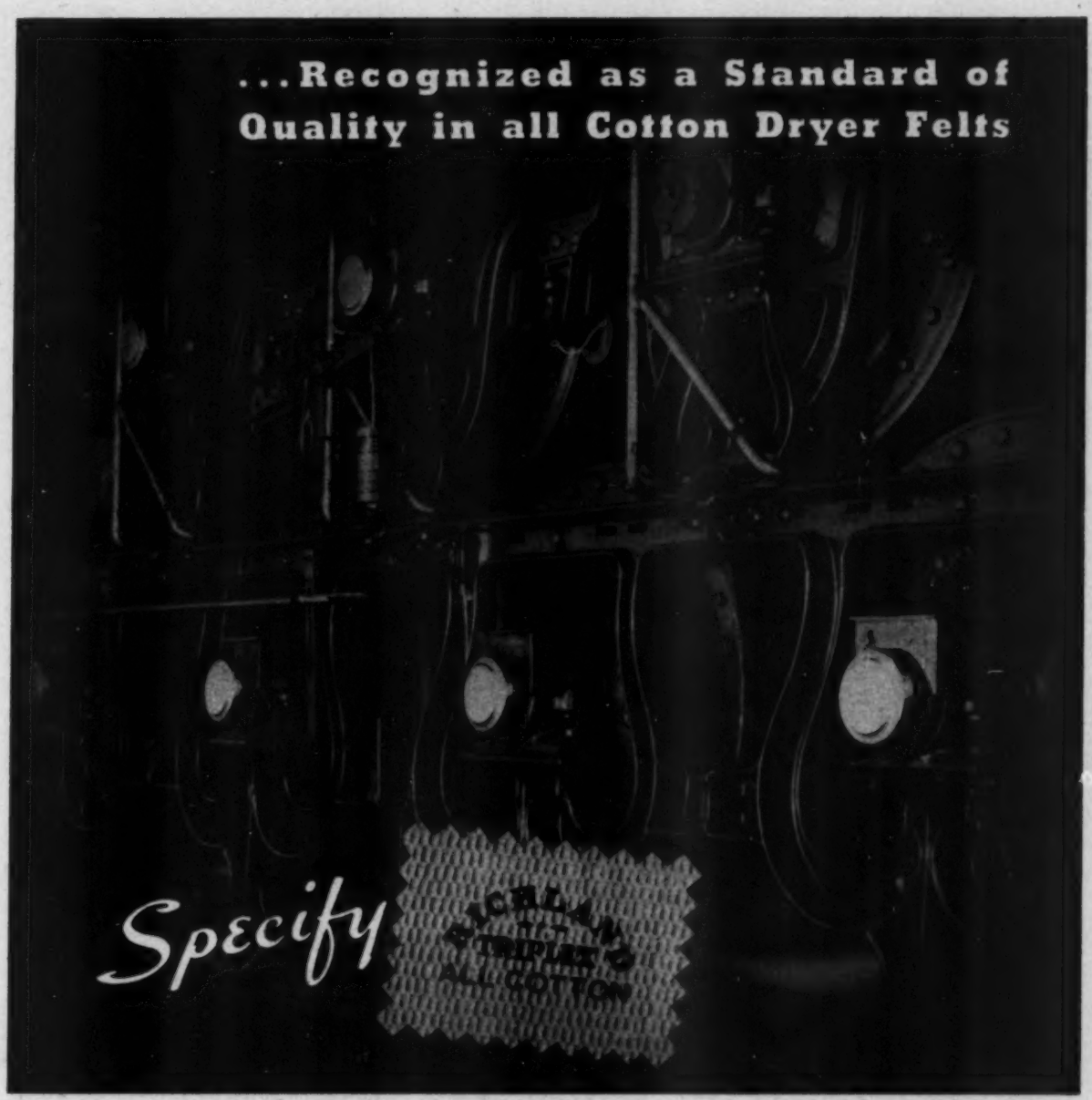
BEAUTIFULLY- MADE PAPER BOXES FOR JEWELRY RANGING IN SIZE FROM ONE ONLY LARGE ENOUGH TO HOLD A BABY'S THIMBLE TO ONE ABOUT 3 INCHES SQUARE, WERE BEING MADE 100 YEARS AGO BY A. L. DENNISON.



THE LARGEST PAPER MACHINE HOOD IN THE UNITED STATES TODAY, SO FAR AS IS KNOWN, HAS A LENGTH OF 251 FT. 7 IN. AND A WIDTH OF 31 FT. 5 IN. THIS HOOD EXHAUSTS OVER 600,000 CUBIC FEET OF AIR PER MINUTE.

ONE OF THE EARLY WRITING MATERIALS, ACCORDING TO PLINY, ROMAN WRITER OF ANTIQUITY, WAS THE INNER BARK OF THE LIME TREE.

...Recognized as a Standard of Quality in all Cotton Dryer Felts



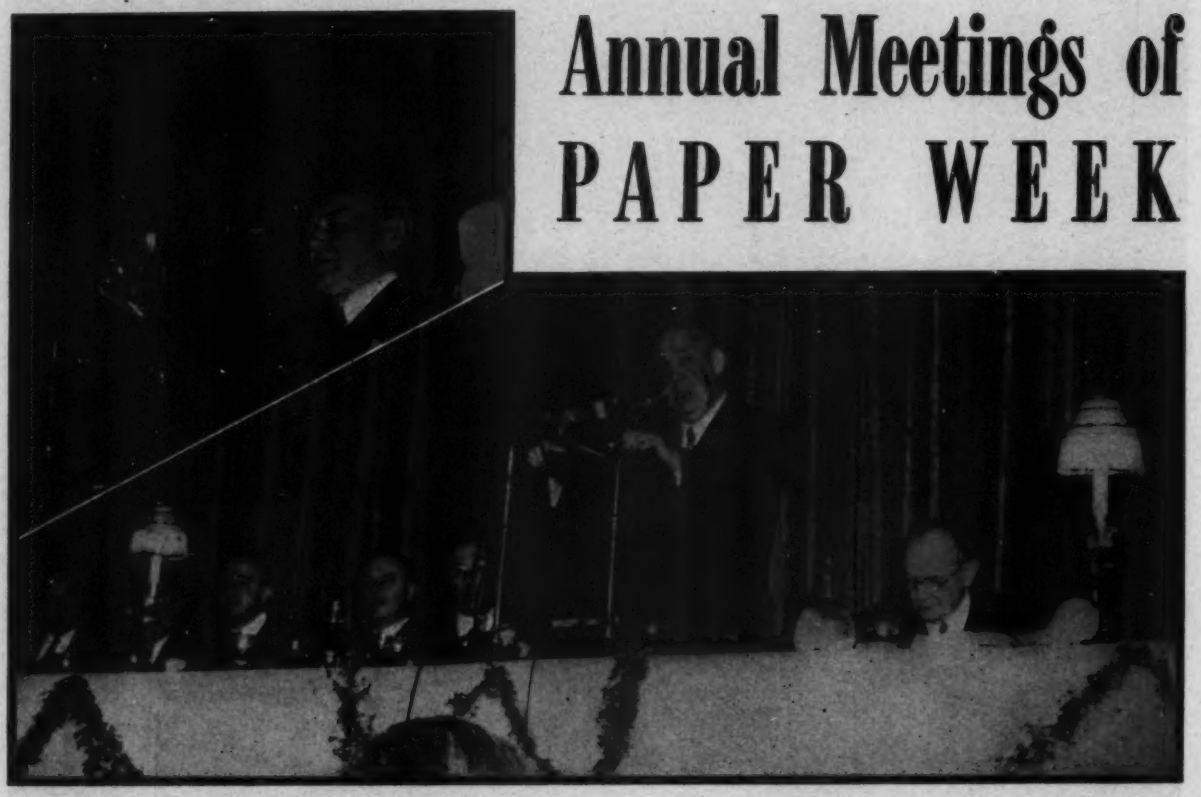
MOST paper men know RICHLAND TRIPLEX, all cotton, heavy duty dryer felts. Their reputation for quality is not of recent making for they have been serving the paper manufacturing industry for many years. Their smooth, uniform contact surfaces have been an important factor in the making of tons of fine quality paper. Their strong, sturdy yarns make them long lived and economical. Their high degree of porosity with minimum amounts of shrinkage and stretch insure low steam consumption and account for fewer production delays. Specify RICHLAND TRIPLEX all cotton dryer felts. They are extremely serviceable, and highly efficient felts.

MT. VERNON WOODBERRY MILLS, INC.

TURNER HALSEY COMPANY
Selling Agents
40 WORTH STREET ★ NEW YORK, N. Y.
CHICAGO · NEW ORLEANS · ATLANTA · BALTIMORE · BOSTON · LOS ANGELES · SAN FRANCISCO

Wartime Subjects Highlight

Annual Meetings of PAPER WEEK



Joseph B. Eastman, director ODT, speaking at the A.P.P.A. luncheon meeting in the Grand Ballroom of the Waldorf-Astoria. Seated next to him (at right) is George H. Mead, president of the A.P.P.A. Mr. Mead is shown (left, above) speaking at the luncheon.

▶▶▶ WAR RESTRICTIONS coupled with war problems and war economy were headline features at the annual meeting of the paper industry associations which met in New York City the week of February 15. All of the events were held at the Waldorf-Astoria with the exception of the meetings and exhibits of the Technical Association of the Pulp and Paper Industry. The Commodore Hotel served as headquarters for this large, scientific body.

The annual get-together of the year was marked by as large an attendance as usual despite transportation economy and other perplexing regulations. Traditional conventions seem to be out for the duration—conventions must be more than just meetings to gain transportation priorities. And the events of Paper Week were unquestionably counted more than just convention gatherings. This year's War Congress was honored by a large official representation from Washington. Among them, even Joseph B. Eastman, director of ODT was a headline speaker.

Many customary exhibits of the mills and converters were missing, but not the exhibitors. They were on hand, but available "wares" were frequently too limited to show. However, the Government came through as a top exhibitor at the TAPPI convention in the Hotel Commodore. This extensive exhibit was built around the theme "Paper Prevents Battlenecks." That's right—it isn't a mistake—and the word is *battlenecks*, not bottlenecks. Government representatives were on hand to explain everything in the exhibit assembled by TAPPI from contributions of the War Department and the pulp, paper, and converting companies. Wartime packaging and wrapping of almost every type of product was included and attracted an unusually large number of non-technical mill men and merchants from their own meetings.

At the Waldorf, one of the unusual exhibits was in the suite of the Denison Manufacturing Company. It seems that Denison is now actually manufacturing a paper parachute—not for human beings who have to bale out, but for dropping up to fifty pounds of supplies from a plane. Denison had one of the parachutes strung up to the ceiling. Bay West Paper Company was proud of its towel dispenser made from plywood and thoroughly streamlined. It is lighter than the former metal cabinet, and Bay West can't see any reason so far for ever going back to steel. At Orchard Paper Company it was a toss-up whether President Herman Orchard was more proud of the company's record on war output or his son. Probably young Robert Orchard wins in the long run, because he was commissioned an officer in the Navy on the second day of the convention.

Hammermill Paper Company displayed a five-foot model of a paper mill in a glass case for the first time, and *Better Packages*, as usual, had a stock of red and white carnations and a very carefully selected model (picked by that expert in pulchritude John Powers) to pin the flowers on paper men's lapels. When the attention of visitors could be directed to such ordi-

You Miss
a youthful face, and suddenly realize that perhaps by now it is in Iceland or Australia, or in Alaska or England or New Zealand.
Men whom many of us only yesterday still thought of as boys, are today fighting the nation's battles the world over, gallantly and well.
With them it isn't "business as usual".
Nor is it with us, who know that their lives imperatively depend on an adequate supply of rubber products.
Nor is it with the distributor and dealer, thus deprived of one of the lines which was fundamental to their business.
We regret more than we can express our inability to supply products for civilian needs to the same extent as formerly. However, once we are free to pursue our normal peacetime course, we shall again be ready to serve you as we have for more than 60 years.
BOSTON WOVEN HOSE AND RUBBER COMPANY
BWH
P. O. BOX 1871, BOSTON, MASS., U.S.A.

L to R—J. K. Carroll, secretary, and W. L. Forsythe, president of Victoria Paper Mills, Inc. . . . Herman Orchard, president Orchard Paper Co., with his son Robert who has just been commissioned in the Navy.

nary things as tape dispensing machines, the lads in *Better Packages* had something unusual to show . . . a machine that would split and cut off wide tape into any required size.

While there were plenty of paper men present at the Convention, it wasn't long before the impression developed that the lads from Washington were doing much of the talking and the papermakers and distributors were doing the listening. Of course, paper men did talk, too. But when they did, the speeches sounded just about the same as though they had been prepared in Washington. The dual problem of how to survive and win the war at the same time was pushed about verbally from morning until night. It was a very small meeting that did not boast at least one representative of official Washington as a guest speaker. Occasionally, as in the case of Colonel Charles M. Piper, Industry Council, OPA, demand for official speakers was so great that there was "rebroadcasting" to make everybody happy. Colonel Piper told an A. P. P. A. group how price regulation had prevented disastrous inflation and then talked on the same theme to the N. P. T. A. Everybody agreed, however, that it was a good speech.

Although nobody from Washington even hinted at official recognition of paper as having that valuable quality "essentiality," the paper industry was praised for its good work and, the "demon" of enforced concentration or consolidation only reared his ugly head once. E. W. Tinker, executive secretary, A. P. P. A., told a session of N. P. T. A., at which he was guest speaker, that "grandiose" plans for the concentration of the pulp and paper industry have been suggested or at least discussed. But in his opinion careful consideration will indicate that only to a most limited degree would such plans contribute anything to the war program.

Perhaps the official "bag" that W. G. Leathers of OPA opened for paper merchants to let out a new "regulatory cat" is an indication that "the worst is yet to come" so far as price regulation is concerned. He outlined in detail a new order, not yet released, that carries the tentative title: "Distributors' Prices for Certain Coarse Papers." Aided by an advisory committee of merchants from all over the country, OPA has worked out a table of mark-ups for distributors in terms of dollars and cents (probably in case somebody isn't good at figuring percentages). For example, if a merchant has a product valued at $4 to $5 per unit and wants to sell 25 to 100 units, he consults the OPA table and finds he can add a profit to the manufacturer's price of $1.10 per unit. If the units are valued at $20 or more each, he goes in for figuring percentage at 17½ per cent for his mark-up.

For a time on Monday it looked as though the high spot for speakers usually achieved by the luncheon of the Salesman's Association of the Paper Industry might be eclipsed by the A. P. P. A. luncheon. The latter had Joseph B. Eastman of ODT, and he was followed by A. G. Wakeman of the WPB, who almost ran away with the show. When he got down to indicating further cuts in paper in the next couple of months of possibly another 10 per cent in newsprint, 5 to 10 per cent in printing and book papers, and 10 per cent in fine papers, the paper men were all ears. "Last March," he continued, "we had 124,000 tons of bleached pulp to allocate; last month we had only 88,000 tons to distribute to the paper industry."

But SAPI came through on Tuesday with another of those sensational luncheons that have been staged regularly for years. This time, in addition to W. W. Chaplin, an NBC commentator and war correspondent, *Time* and *Life* provided a film, "One Day in Russia," the result of a day's work by 160 Red Army cameramen, not including those who lost their lives in the exploit. Mr. Chaplin not only talked about the needs of Russia today, but he even brought paper into the discussion. He pointed out that Russia has been unable to produce or secure sufficient paper for war.

At TAPPI, much of the technical discussion had a distinctly war flavor, especially the Packaging and Container and the Graphic Arts sessions. The luncheon in the Commodore was also addressed by OPA administrator Prentiss M. Brown.

As Paper Week drew to a close, new officers were elected by the various associations and the members and guests prepared to return home for another year of war on the home front. George H. Mead, chairman of the board, The Mead Corporation, was re-elected president of A. P. P. A. Corwine Roach, Capital City Paper Company, Springfield, Illinois, succeeded Richard Kettle as president of N. P. T. A. The great Second World War Convention of the paper industry was ended.

PAPER IN THE WORLD *BEYOND* THE WAR

When peace comes. Will the paper industry be ready to meet its challenge?

Right now, of course, winning the war comes first. All of Brown Company's research experience and facilities are devoted to that end.

But, in all lines of industry, changes are now taking place that will drastically affect our economic life after the war.

New and improved products will spring from the research and manufacturing discoveries of the war.

As research pioneers in wood cellulose, we at Brown Company are accustomed to looking into the future. We can visualize how war time developments now going on in our laboratories can benefit users of paper and paper products in business and the home.

Paper mills will be able to make better paper, thanks to new qualities imparted by Brown Company's wood pulps. Paper converters will produce more useful paper products with the new Engineered Papers. Paper merchants will have improved items to fill industrial and household needs.

The results of present Brown Company war research will do much to help paper achieve its full peace time possibilities. With this in mind we shall welcome the opportunity to discuss pulp and paper requirements with manufacturers and converters who are planning postwar products.

NORTHERN SPRUCE NORTHERN BIRCH RESEARCH LEADERSHIP MANUFACTURING PRECISION

BROWN COMPANY

FOREMOST PRODUCERS OF PURIFIED CELLULOSE

SALES OFFICES: 500 FIFTH AVE., N.Y.C. — *MILLS* BERLIN, N.H. & LA TUQUE, P.Q.

A.P.P.A. Wartime Conference

▶▶▶ THE SIXTY-SIXTH ANNUAL CONVENTION and Wartime Conference of the American Paper and Pulp Association and affiliated organizations in the Waldorf-Astoria Hotel, New York, on Sunday to Thursday, February 14 to 18, inclusive, was exceptionally well attended. Although many, and especially those from the West, were delayed in reaching New York for the convention owing to sub-zero weather conditions holding up trains, the yearly gathering of the paper and pulp industry doubtless established a new high mark of attendance, with virtually every paper and pulp mill in the United States and Canada represented.

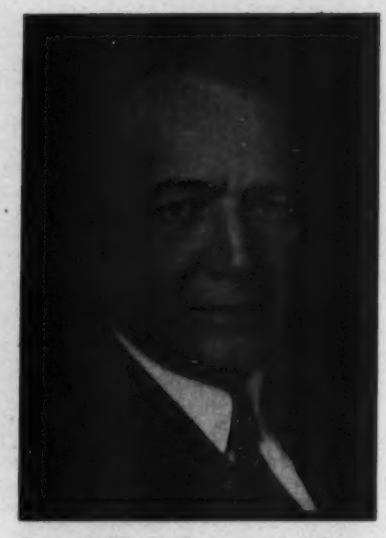
Essential wartime production and complete and hearty co-operation with the wartime Government at Washington constituted the keynote of the convention. Practically every speaker at the convention, every one of the almost innumerable meetings on the five-day program, and every report rendered by the various Association officers dealt with these subjects. Chiefs and other executives of the paper and pulp and other branches of the Washington wartime agencies were on hand, and undoubtedly the outcome of the convention will be a fuller and closer coordination of effort by the paper industry and by the Government in the nation's all-out task of winning the War.

OFFICERS FOR 1943

At the joint meeting of the Association's Executive Committee and Board of Governors in the Jansen Suite, Wednesday morning, February 17, George H. Mead, president of the Mead Corporation, Chillicothe, Ohio, was re-elected president of the American Paper and Pulp Association for 1943. D. K. Brown, of the Neenah Paper Company, Neenah, Wis., was re-elected first vice-president.

The following vice presidents also were elected:

Hugh J. Chisholm, Oxford Paper Co., New York City; *R. J. Cullen,* International Paper Co., New York City; *D. C. Everest,* Marathon Paper Mills Co., Rothschild, Wis.; *P. H. Glatfelter,* P. H. Glatfelter Co., Spring Grove, Pa.; *James L. Madden,* Hollingsworth & Whitney Co., Boston; *John R. Miller,* West Virginia Pulp & Paper Co., New York City; *Cola G. Parker,* Kimberly-Clark Corp., Neenah, Wis.; *John L. Riegel,* Riegel Paper Corp., New York City; *Norman S. Stone,* Mosinee Paper Mills Co., Mosinee, Wis.; *Dwight L. Stocker,* Michigan Paper Co., Plainwell, Mich.; *Norman W. Wilson,* Hammermill Paper Co., Erie, Pa.; *J. D. Zellerbach,* Crown Zellerbach Corp., San Francisco, Calif.



George H. Mead, who was re-elected president of the American Paper and Pulp Association.

E. W. Tinker was re-appointed executive secretary and treasurer of the Association, and Wise, Corlett & Canfield were re-named Association counsel.

The report of the Technical Committee at the joint Executive Committee-Board of Governors meeting emphasized the need for the wider use of waste paper if the paper industry is to produce the amount of paper needed in the war effort and for civilian use. It was pointed out that the shortage of pulp, due to the pulpwood situation, will require greater conservation of raw materials, and there must be a wider collection of waste paper for conversion into new paper and paperboard than at present.

The Committee also reported that a survey will be made of the extent and fields in which women can be employed to take the places of men called to the armed services. This survey will be made to show employers the fields where women are already satisfactorily employed.

Progress has been made in the biological control of papermaking processes, in the field of providing bacteria-free containers and wrappers, the Committee reported.

One of the highlights of the convention was the annual luncheon of the American Paper and Pulp Association on February 15 in the Grand Ballroom of the Waldorf-Astoria. President George H. Mead presided. The principal speakers were Arthur G. Wakeman, chief of the Paper and Pulp Division of the War Production Board; Joseph B. Eastman, director of the Office of Defense Transportation, and Colonel Charles M. Piper, business analyst and member of the Advisory Committee of the Office of Price Administration.

Mr. Wakeman's address may be found on page 1272 of this issue.

Mr. Eastman told the paper and pulp manufacturers that they have cooperated well in the wartime effort to economize on shipping, but urged all industry to make further studies on how to save on transportation. He said railroads were approaching capacity and might reach their peak when war production hits the peak, and that closer co-operation between industry and the public and the railroads is necessary to ease the strain on facilities. Unless satisfactory balance is achieved, he said, a zone system for restricting civilian travel may have to be set up by his agency.

Emphasizing that the main concern of the ODT is to provide reserve transportation capacity for any emergency which may arise, Mr. Eastman estimated that owing to rubber scarcity and manpower shortage, there is likely to be a diminishing supply of truck and bus transportation, with an added burden upon the railroads. Current troop movements, he observed, absorb more than 50 per cent of available Pullman capacity.

Mr. Eastman urged industry to take advantage of the opportunity to make voluntary traffic studies looking to elimination of cross hauling and unnecessary use of any form of transportation facilities. He noted that cooperation of shippers with the military authorities had speeded the loading and unloading of cars, contributing greatly to railroad efficiency. Pooling of facilities by the carriers, he estimated, has freed for use up to 100,000 cars.

Railroad rate increases since the beginning of the war have been very modest in comparison with World War I when they were raised as much as 25 per cent, he stated, adding that curbing of such rate increases proved the soundness of governmental policy to prevent inflation.

Make your paper machines more productive for war needs—use more Timken Bearings. Then you'll also be ready for post-war conditions.

The more Timken Tapered Roller Bearings you have in your paper mill equipment the better it will perform and the less it will cost for operation and maintenance.

A few Timken Bearings are better than none in any machine, but it takes a complete installation to produce top-notch results—maximum speed and precision; full protection against radial, thrust and combined loads and misalignment of moving parts; utmost endurance.

Manufacturers whose engineers know what Timken Bearings can do and make full use of them not only are assured of machines that *operate better,* but also machines that *sell better*—for no name in bearings is as well-known as "TIMKEN". The Timken Roller Bearing Company, Canton, Ohio.

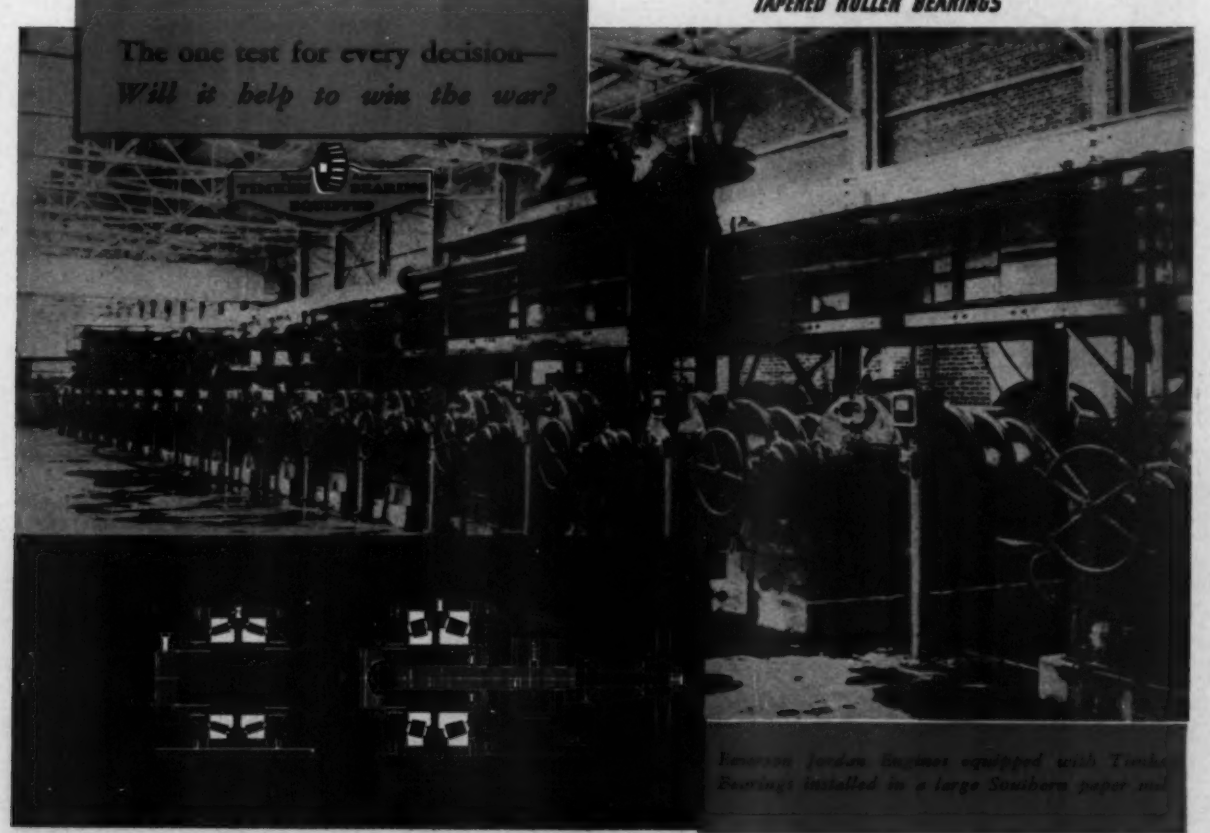
"All There Is In Bearings"

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

The one test for every decision—
Will it help to win the war?



Timken Tandem Engines equipped with Timken Bearings installed in a large Southern paper mill

The A.P.P.A. luncheon meeting was held in the Grand Ballroom of the Waldorf-Astoria.

Colonel Piper counseled that shortage of labor and the resulting shortage of pulpwood might enforce concentration of production in fewer plants. "If pulpwood supplies and labor get much scarcer than they are now, concentration is clearly indicated with closed mills getting a fair compensation for maintenance," said Colonel Piper. "Horizontal industry-wide cuts in proportion cannot be compensated by a continuous series of price increases. We could by such a method see newsprint go to $500 a ton. Concentration of production in fewer plants is logical because the majority of mills cannot be converted to war work. Consideration will be given to small business organizations in any plan of the kind."

Commenting on the paper and pulp outlook, Edward R. Gay, director of the industrial commodity division of the Office of Civilian Supply, said that best current estimates for essential requirements of all types of paper and paperboard is somewhat below current total production.

"This does not mean," he explained, "that we are insisting that production be brought down to that level. Even though current production is above immediate requirements, latest appraisals of pulpwood supplies, and consequently production, indicate that we shall have barely enough to produce the quantities of paper and paperboard which, we believe, will be needed before this year is over."

Traffic Committee

The Special Traffic Committee of the American Paper and Pulp Association held an interesting meeting on the afternoon of February 15 in the Waldorf-Astoria. Addressing the meeting, F. E. Hufford, special assistant to the director of the Pulp and Paper Branch of the WPB, stated that the pulp and paper industry is conserving transportation, rubber, trucks, truck parts and gasoline.

Mr. Hufford explained this point by mentioning the following:

Heavier Loading—Figures were given to show that the average lading per car in 1942 increased over that of 1941 even before the effective date of ODT Maximum Carloading Order; in some instances it was indicated the average carloadings had increased as high as 63.5 per cent.

Car Detention—The industry has made a splendid record in handling cars received for loading and unloading, and has contributed to the faster turn around of cars.

Curtailment and Limitation Orders

NOW *and after the war*

The heat is on in our foundry. Tons and tons of metal are flowing. Large and small castings are pouring out for the war machine, heavy, intricate castings for the machine tools that make the parts for fighting ships and guns and tanks and planes. Many more men were needed to keep production moving, new equipment was added, new technical skill employed. It's production for Victory now, some to keep paper mills going. There'll come a day when the output of our foundry will be going into the reconstruction after the war. Paper mills will need new machinery and replacements. All kinds of castings will be required for Appleton post-war paper making equipment incorporating many engineering advancements. We will have the men and the facilities then to give you fast service and the finest castings.

THE APPLETON MACHINE COMPANY
APPLETON · WISCONSIN

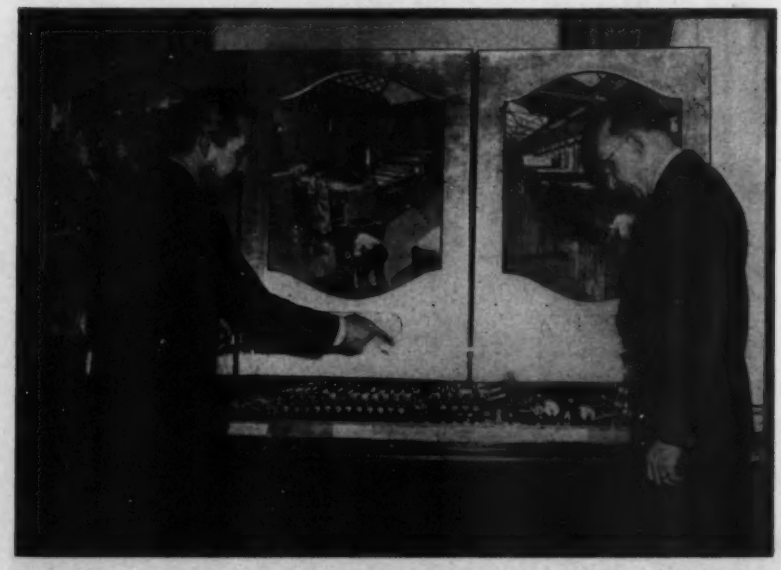
L to R—At the Bay West Paper Co.'s exhibit, Bill Servotte, Bob Quigley, and Roy Amick, who were in charge, find something of interest to all of them in the morning paper. . . . Andrew Maisch and Ed. Hanigan, of the Dennison Mfg. Co., pose before a panel of the company's exhibit showing some of its war products. At left may be seen the paper "chute" which is made to carry and drop to the ground up to 50 lb. of supplies.

—Due to the recent curtailment orders and limitation orders issued by the WPB, the amount of transportation used by the industry has been reduced. In 1942, it is estimated that the pulp and paper converting industries required 2,700,000 cars to handle their finished products and raw materials. The aforementioned WPB orders would reduce transportation requirements 10 per cent, a saving of 270,000 cars. The effect of the Maximum Carloading Order should produce another saving of 10 per cent or 243,000 cars, making a total saving of 513,000 cars.

Wood Pulp—Due to orders for allocating wood pulp during the months of August, September, and October, 1942, and banning shipments of wood pulp from the Pacific Coast to the East in November and December, it was estimated there was a saving of 390,000 car miles. Although it is too early to indicate the savings that may be made during 1943, it is believed there will be considerably less transportation required than in 1942.

Pulpwood—Normally transported by truck direct from woods to the mill, pulpwood is now taken to the nearest railhead or barge landing thus conserving tires and gasoline.

Compression—It is estimated that the order covering the compression of toilet tissue rolls will of itself save approximately 6,000 cars annually. A study is being made of the saving to be effected by the compression of other packaged tissue and stationery.



In the exhibit at the Waldorf-Astoria, the Hammermill Paper Co. displayed a 5-ft. model of a paper machine for the first time this year. Panels behind the machine (which was in a glass case) were painted in full color. Grant Richardson, the company's eastern district sales manager, explains the model to Winfield Pridmore, of Paper Merchants, Inc.

◆

CONVENTIONS AND COMING EVENTS

Apr. 20-22—14th Annual All-Ohio Safety Congress, Neil House, Columbus, Ohio.

May 16-19 — National Paper Box Manufacturers Association Silver Anniversary Convention. The Drake Hotel, Chicago.

June 15-17 — National Convention of the American Pulp and Paper Mill Superintendents Association, Commodore Hotel, New York City.

STATED MEETINGS

Technical Association of the Pulp and Paper Industry.

Delaware Valley Section—First Friday of each month—Engineers' Club, Philadelphia.

Kalamazoo Valley Section — First Thursday of each month—Park American Hotel, Kalamazoo, Mich.

Lake States Section — Second Tuesday of each month — Conway Hotel, Appleton, Wis.

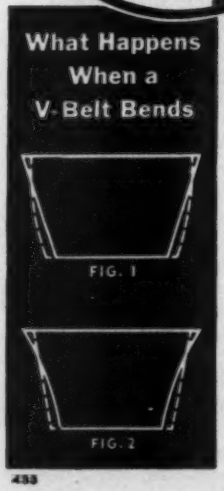
New England Section — Regular meetings of this group have been discontinued. The next meeting will be held in March.

The American Pulp and Paper Mill Superintendents Association, Inc.

Michigan Division — Third Thursday of each month — Park American Hotel, Kalamazoo, Mich.

If you care about better V-Belt performance

MAKE *this* SIMPLE TEST!



Take any V-belt that has *straight* sides. Bend that V-belt while you grip its sidewalls between your fingers and your thumb—as shown in the large photograph above. As the belt bends, you will *feel* its sides *bulge out*—as shown in figure 1 on the left.

Now do the same thing with a belt that is built with the patented *Concave* side. You get a similar change in sidewall shape—but what a *different result!* The precisely engineered Concave side becomes perfectly *straight*—as shown in Figure 2. This belt, when bent, exactly fits its sheave groove. There is no side-bulge.

Two savings result. FIRST:—The full side of the belt *uniformly* grips the sheave-groove wall. This means *uniform wear—longer life!* SECOND:—The full side-width grip on the pulley carries heavier loads without slippage. This saves belts and power, too!

Only belts built by Gates are built with the Concave side, which is a Gates patent.

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"Paper Prevents Battlenecks"

Theme of TAPPI Annual Meeting

▶▶▶ AT THE TOP OF the front cover of the program of the 28th annual meeting of the Technical Association of the Pulp and Paper Industry (held February 15-18, 1943, at Hotel Commodore, New York City) likewise similarly placed on the booklet covering condensations of papers of the convention (for the past few years a regular publication supplied each registrant at the annual conclave), and also greeting each visitor to the convention exhibit of paper products developed to meet the needs of the war program was emblazoned the message "Paper Prevents Battlenecks." Battleneck, according to a communication issued by the U. S. Army and noted by the executives of TAPPI, is a fighting word. Substituted for the peacetime word "bottleneck," it means an increased flow of blood rather than a restriction in flow of materials. With such an interpretation, it is easy to visualize the part that paper is playing in preventing battlenecks. The exhibit itself, however, was tangible proof of the splendid job that is being done by the industry in this direction.

Wartime Exhibit of Paper Products

The exhibit, in charge of Vincent Waters of the TAPPI staff, revealed the versatility of pulp, paper, and paperboard in relieving the drain on the country's stock pile of critical metals. It showed ammunition and ration containers, camouflage nets, ordnance protective wrappers, and containers; chemical warfare service items; projectile containers; airplane parts fabricated from paper laminate; paperboard drums; paper and paperboard containers with various designs of closures; paper folding boxes with individual compartments for small arms ammunition; folding paper boxes with insert bags for powdered milk, eggs, etc.; containers for tobacco products; integrated paper lunch-tray sets for war plants; waterproof, greaseproof, and oilproof paper bags, boxes, wrappers and other containers. It was impressive in its variety and complexity of products.

A partial list of the "Paper Prevents Battlenecks" exhibitors appears on page 1254 of this issue.

Annual Report of Secretary-Treasurer

In the report of the secretary-treasurer, presented by R. G. Macdonald during the opening session of the convention, it was related that many members of the Association have entered the armed services while many others have become associated with other industries for the duration; and that, on December 31, 1942, the total individual membership of the Association was 1,907; corporate membership, 95; and sustaining membership, 97. The Association lost through death during the past year the following 14 members: Stephen Beard, G. S. Brazeau, W. S. Crocker, Olaf Hedstrom, E. O. Hemstreet, V. G. Heinmuller, A. H. B. Jordan, Edward G. Lunn, Charles McDowell, W. A. Nivling, August F. Richter, John C. Sherman, Dr. Fritz L. Straus, and Homer F. Ziegler.

R. A. Hayward was re-elected president of the Technical Association of the Pulp and Paper Industry.

Mr. Macdonald also mentioned that seven special reports were issued by the Association during 1942: namely, The Colloidal Properties of Aqueous Dispersions of Fillers; Felt Washing and Breaking-In Procedure; Starch-Coated and Waterleaf Papers for Offset Printing; Bleaching Plant Paints; Packing Materials in Sulphate Pulp Mills; Handling Baled Dry Pulp; and Paper Roll Cores.

Continuing with his report, Mr. Macdonald commented that the Association has functioned effectively for many years as an employment clearing house; that currently the jobs outnumber the men, a condition which will undoubtedly prevail until the War has ended; and that a grant of $650 was made during 1942 to the Fundamental Research Committee for Research Project No. 21 for a study by Prof. Purves of Massachusetts Institute of Technology on the Oxidation of Cellulose.

Among the new publications received from the Association by the members, as cited by Mr. Macdonald, were the following: *Paper—The Lifeblood of Civilization; Industrial Water for Pulp, Paper, and Paperboard Manufacturer;* and *Saving Fourdrinier Wires.*

The Association, likewise, commented Mr. Macdonald, initiated a new service through the *TAPPI Bulletin,* a publication (4-8 pages) that has been appearing about twice a month since its inception essentially as a war service to assist the industry and its customers in meeting the problems derived from war requirements.

Brief mention was made by Mr. Macdonald of the study of packaging of dehydrated foods that is being carried on at the New York Agricultural Experiment Station at Geneva, New York; the work of the staff for the War Production Board and for the American Paper and Pulp Association; of a meeting held in June, 1942, at the Stevens Hotel, Chicago, to assist Major Charles Herman and the Subsistence Research Laboratory of the Chicago Quartermaster Depot in establishing means of evaluating new paper ration containers; and of a special financial contribution of the Association to the building program of the Institute of Paper Chemistry at Appleton, Wisconsin.

President's Address

R. A. Hayward, president of the Association, in making the president's address, referred to the essentiality of paper to the war program; to the responsibility of the technical man within the industry in this effort; to the literature prepared and distributed

Technical books for millions. Paper machines running constantly. Printing presses operating day and night to meet the demand. Sales reaching giant proportions. Technical books outselling popular best sellers. All the result of the war demand for information on new jobs in military and industrial work. Yes, bookdealers everywhere are reporting millions of new buyers among war workers, men in the service and those who are preparing to qualify themselves for these activities.

Here is another example of how paper is greatly contributing to the winning of the war. So vital is the need for this technical information, authorities state that it is not likely manufacturers of book paper will be asked to reduce their output.

And paper is doing its part in a thousand other ways in the war program. That is why paper making equipment must be kept running. For paper is vital to victory.

Jones

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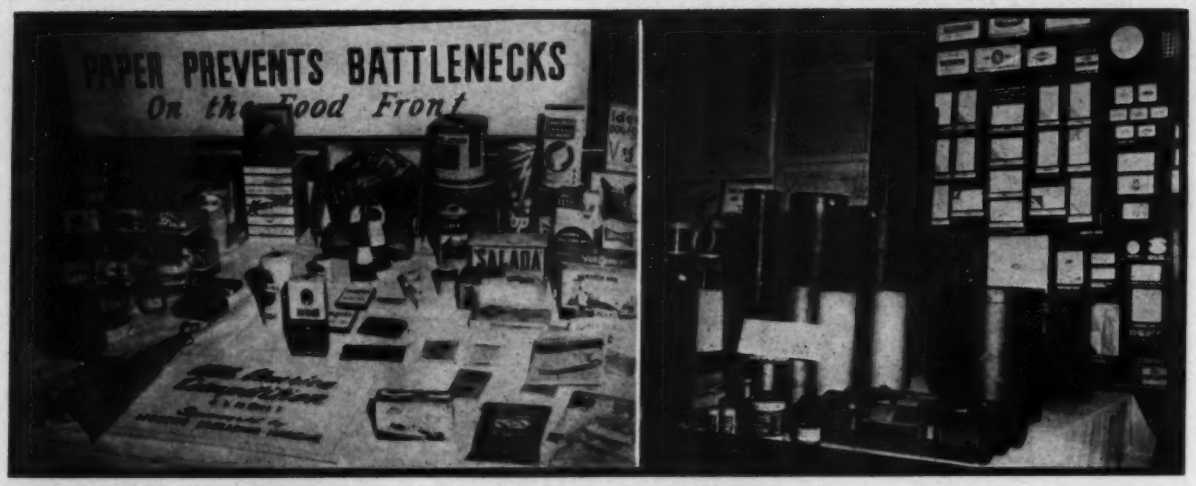
Builders of Quality Machinery for Paper Mills



Many interesting displays featured the TAPPI exhibit of "battlenecks" at the Commodore Hotel. Displayed at the upper left are wartime packages. At the right are shown treated-impregnated papers used to replace critical materials. This exhibit was contributed by the Cleveland Container Corporation. At the left, below, Charles A. Walz, Corps of Engineers, Spare Parts Branch, Columbus, Ohio, Quartermaster's Depot explains packaging of military supplies for overseas.

by the Association; to the committee work, preparing limitation recommendations on critical chemicals and supplies, by some of the technical men of the industry; and to the development by other technical men of new paper products which are substituting for critical metals in the packaging and preservation of materials of war.

Mr. Hayward likewise commented upon the 1942 fall meeting of the Association (held in Boston), stating that it was one of the most constructive meetings ever held. He gave the New England Section a great deal of credit for arranging the meeting.

Attention also was called by Mr. Hayward to an executive committee meeting held in Boston at the time of the fall meeting which resulted in an appropriation of funds for the establishment of a War Bulletin Service that has since been instituted.

In discussing the problems of the industry today, Mr. Hayward said, in part, that the pulp supply will be reduced during the current year, due to a shortage of wood in all sections of this country and Canada; that curtailment orders have been issued, limiting the production of various grades of paper and eliminating non-essential uses, it being evident that the pulp supply will not produce enough paper products to meet the essential and military needs of the country; and that many new uses of paper are being developed which will be classed as essential and will replace less essential civilian uses.

It is the spirit of the Association, concluded Mr. Hayward, to give everything it has to help the Pulp and Paper Industry make its maximum contribution to the war program.

Election of Officers

As has become an established custom of the Association, election of officers for the coming year took place by mail balloting previous to the convention. It was announced at the convention that this voting resulted in the re-election of Ralph A. Hayward, president and general manager of the Kalamazoo Vegetable Parchment Company, Parchment, Michigan, as president; and the re-election of Vance P. Edwardes, sulphite superintendent, International Paper Company, Palmer, New York, as vice president.

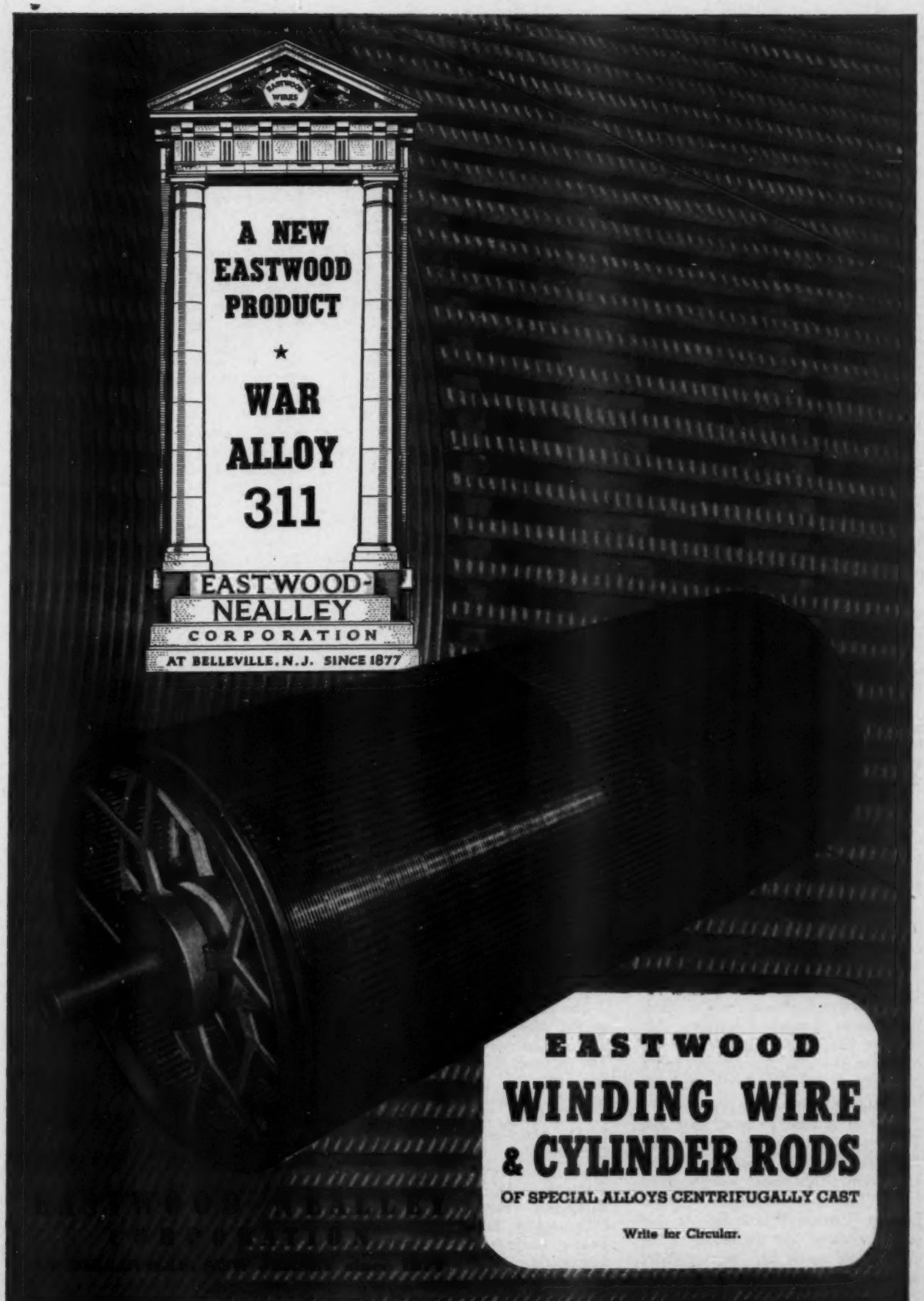
The following members were elected to serve three years on the executive committee; Albert Bachmann, vice president, Missisquoi Paper Company, Sheldon Springs, Vermont; J. D. Malcomson, technical director, Robert Gair Company, Inc., New York City; Paul Hodges, assistant general manager, Crossett Paper Mills, Crossett, Arkansas; and A. E. Montgomery, vice president and western manager, J. O. Ross Engineering Corporation, Chicago.

Award of TAPPI Medal

Since 1928, the Association has awarded ten gold medals to individuals who have made outstanding contributions to the technical advancement of the industry. These awards have been made to William H. Mason, Ogden Minton, Ernst Mahler, Edwin Sutermeister, William H. Millspaugh, Clarence J. West, Carl B. Thorne, J. Newell Stephenson, Otto Kress, and Robert B. Wolf.

The executive committee of the Association awarded the 1942 medal to Harry Fletcher, president, Fletcher Paper Company, Alpena, Michigan,

Harry Fletcher, TAPPI medallist.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the presentation being made to Mr. Fletcher during the annual luncheon, the concluding meeting of the convention, by Robert Wolf, manager, Pulp Division, Weyerhaeuser Timber Company, Longview, Washington. In making the presentation, Mr. Wolf highlighted the career of the recipient. Some of the stepping stones follow:

Mr. Fletcher graduated in 1907 in chemical engineering from the University of Michigan. On leaving college, he went to work for the Fletcher Paper Company, Alpena, Michigan, of which he is now president. In 1912, he wrote an article for *Paper* on "Obtaining Costs in a Paper Mill." This article, probably due to its pioneer character, was reprinted in 1933, during the National Recovery Administration, by *Paper Trade Journal*.

In 1914, Mr. Fletcher approached the Sulphite Wrapping Paper Division of the American Paper and Pulp Association with the idea of organizing the technical men of the industry. This plan, approved by President Hastings and his Executive Board, finally led to the organization of the Technical Association of the Pulp and Paper Industry.

During World War I, Mr. Fletcher was a member of the Michigan War Board; Staff Assistant, Emergency Fleet Corporation; and chief of Division of the American Protective League.

Mr. Fletcher has been identified with the development of high density bleaching. One type of bleacher, the Fletcher type, is designated through the use of his name.

Mr. Fletcher also has held the following positions: president, Crittal Casement Window Company; vice president, Alpena Power Company; president, Gilchrist Fordney Lumber Company; president, Gilchrist & Company, Ltd.; president, Gilchrist Timber Company; president, Bob-Lo Excursion Company; director, Alpena Savings Bank; director, Rust Land and Lumber Company; director, Three States Lumber Company; and director, Rust-Owens Lumber Company. He likewise has been a member of the Michigan Board of Aeronautics, and a member of the Isle Royal National Park Commission.

It is of interest to recall that Mr. Fletcher made the presentation of the first TAPPI medal award to William H. Mason. This medal was presented at the 1928 fall meeting of TAPPI, held at Wausau, Wisconsin. At that time, he stated that the motto of the Association should be, "Service above Self." The intervening years have proven the truth of that concept.

Address of the Hon. Prentiss M. Brown

The annual luncheon, which brought the 28th annual meeting of TAPPI to a close, was presided over by R. A. Hayward. At the speakers table were numerous dignitaries of both the pulp and papermaking industry and the Government. Many of these men were introduced to the luncheon guests by Mr. Hayward previous to the presentation of the TAPPI medal to Mr. Fletcher. Following the presentation, Mr. Fletcher was called upon to introduce the Hon. Prentiss M. Brown, Administrator, Office of Price Administration, as the guest speaker.

In his address, Mr. Brown pleaded for a complete unity of spirit among the people of this country both in regard to our foreign policy and our conduct of the War. He emphasized the need of public support in the price control job; and made it clear that there must be no strike, and there must be no compromise. A break-through in price structure, he related, would cause a break-through in labor structure.

In looking to the future, Mr. Brown said that the nations which are now united must stand together; that seeds of disunity must not be permitted to nurture and grow; that national selfishness will only result in a war that will involve our grandchildren.

"Let Us March On Behind the Chief to Victory" was his strong concluding appeal for the support of our Government in its every effort to prosecute the war to a successful ending.

Program Themes

The program of the convention devoted an individual session to each of the following themes: graphic arts; water and washing; packaging and container; specifications and tests; papermaking; testing; and cylinder machine round table. In addition, pulping was the theme of two sessions; engineering, of two more; and there were two general sessions.

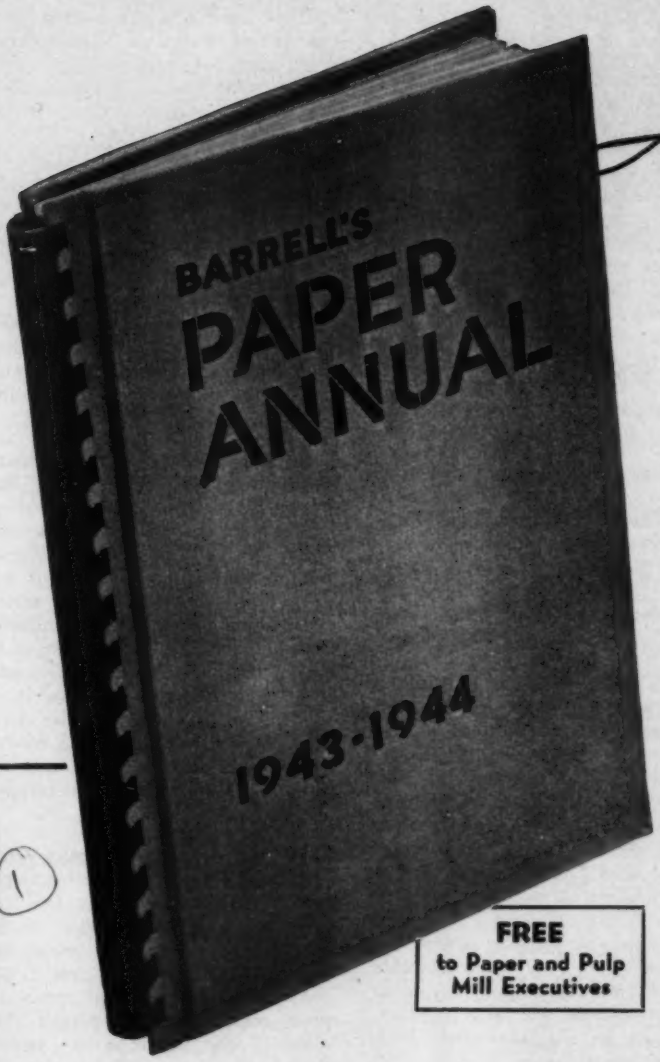
The convention opened in general session with R. A. Hayward, president of the Association, as chairman. The chairmen of the other sessions in the order of program presentation were: M. S. Kantrowitz, Graphic Arts; L. B. Miller, Water and Washing; J. D. Malcolmson, Packaging and Container; S. D. Wells, Pulping; A. W. Nickerson, Specifications and Tests; Paul Hodges, Pulping; A. E. Bachmann, Papermaking; Roderick O'Donoghue, Engineering; Harry F. Lewis, Testing; A. E. Montgomery, Engineering; A. E. Bachmann, Cylinder Machine Round Table; and Vance P. Edwardes, Second General Session.

Briefs of Technical Papers

Approximately 60 technical papers were scheduled for presentation before the several sessions. Brief excerpts or condensations from a number of them follow:

Some Factors In Detergency, Foster Dee Snell—The known factors in detergency are (1) initial alkalinity or *p*H of the detergent solution, (2) total alkalinity or buffer value of the detergent solution, (3) effect in lowering of interfacial tension between the soil and water, and (4) deflocculating and emulsifying power . . . Soil is more readily removed by a strongly alkaline washing solution than a weakly alkaline one . . . A solution of borax and soap is not as effective as a solution of soda ash and soap; and soda ash and soap is not as effective as sodium metasilicate and soap . . . On the basis of initial and available alkalinity or lowering in interfacial tension, the order of decreasing activity of builders when added to soap is sodium hydroxide, sodium orthosilicate, sodium metasilicate, trisodium phosphate, sodium carbonate, modified soda, sodium chloride, and borax.

Development of Wartime Paper Products, John Strange, War Production Board—The objective of the War Products Development Section of the Pulp and Paper Division of the War Production Board is to encourage and facilitate the development of paper and paperboard for war uses or as substitutes for critical materials . . . Thus far, entirely separate from items handled merely through clearance, we have dealt with 35 projects . . . The first project of the Section involved a study of special treatments for paperboard to be used in the overseas shipping container . . . Early last fall, the development of high strength, low pressure paper base plastic laminates received rather wide-spread publicity . . . In order that the Section might be in position to answer inquiries and in order that it might be helpful in the development itself, a search project was set up with the general objective of investigating the status of paper base plastics, particularly as they might relate to the building of aircraft . . . It was quickly seen that the development possessed merit and that it was desirable for the Section to inform itself in detail on its several phases . . . Three months of intensive work have been spent in the survey, and appreciable information has been gathered . . . Other projects of the Section involve subjects as varied as the development of a paper substitute for steel strapping and for binder and wrapping twine, garbage pails, paper vests, anti-



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tank mines, containers for flake caustic and alfalfa meal, substitutes for metal light reflectors, latex cups and basins, turpentine pans and gutters, helmet brims, rain capes, new map papers, incendiary bomb fins, hand grenades, practice bombs, oil containers, and papers for carrying a variety of greasy or volatile materials . . . In addition to a general bulletin, the Section will issue, from time to time, special technical bulletins, dealing with specific subjects . . . A very successful application of paperboard to an ordnance problem will save enough steel to build 300 tanks per month or considerably over 100,000 tons per year.

Further Experimental Study of Beater Practice in the Manufacture of Offset Papers. Charles G. Weber, Merle B. Shaw, Martin J. O'Leary—For approximately 10 years, the National Bureau of Standards and the Lithographic Technical Foundation co-operated in research on the paper requirements of the offset lithographic process. Previous publications contain information showing the importance of numerous properties of papers in printing and on the relationship between the beating of wood fibers and those properties. This article is an extension of the work on beater practice to include rag fibers.

A series of papers was made of fibers from new rags, old rags, and mixtures of old rags and sulphite.

The rag fibers responded differently to beating than strong wood fibers. Old rags withstood prolonged beating required for the development of optimum formation and strength without the adverse effects of such treatment on expansivity noted in the preparation of sulphite and sulphate wood fibers. All of the rag-fiber papers had lower expansivity than wood fibers of comparable bond strength. The folding endurance of papers containing equal parts of strong wood fibers and old rag fibers was approximately the average of the two, which is not true of papers which are mixtures of wood fibers.

Ink Drying as Affected by Various Paper Stocks. M. J. Leckey—Frequently, unexpected results are obtained in the drying process of printing inks. These unexpected results cannot always be traced to the ink itself or to pressroom difficulties. Experimentation and experience has shown that paper is often a contributing factor to these unusual phenomena.

The hope is expressed that mutual co-operation between the paper industry and the printing ink industry will result in the elimination of many drying problems and perhaps even bring about new developments through a close control of paper variables.

Application of the Lithographic Process to War Work. William H. Wood—The war emergency makes it possible for lithographers to contribute directly in furthering the war effort by the adaptation of lithographic processes in the manufacture of templates, dials, gage sticks, aeroplane loft panels, and similar items.

Among the many miscellaneous applications of the lithographic process in war work are found the making of metallic work sheets and instruction sheets as well as the printing of ultraviolet fluorescent background field maps, and aerial navigation maps.

Wartime Government Specifications for Paper and Envelopes. M. S. Kantrowitz and R. H. Simmons—In backing the war effort, unbleached pulp has been substituted for bleached pulp not to exceed 35 per cent of the furnish in sulphite papers wherever and to whatever degree utilitarian considerations permit without detriment to essential printing.

The specifications for all chemical wood writing, manifold, bond, ledger, and index papers formerly permitted a maximum of 2 per cent of ash. Effective January 1, 1943, the specifications for these types of papers have been changed to permit 5 per cent ash in the finished product, provided that the paper fillers are not of an abrasive character so as to cause excessive wear of ruling pens or printing plates.

In view of the shortage of sulphite pulp it was found necessary to permit approximately 60 per cent groundwood pulp in machine-coated book and mimeograph papers.

The brightness ceilings ordered by the War Production Board are given in General Limitation Order L-XI.

A simplification and standardization program was issued by the Director of Industry Operations of the War Production Board in the form of a series of schedules contained in Limitation Order L-120. This order became effective July 24, 1942; it was revised October 29, 1942, and amended November 30, 1942.

The Container Co-ordinating Committee of the War Production Board has issued (October 20, 1942) a 150-page book of *Army-Navy General Specifications for Packaging, Packing and Marking for Overseas Shipment* (U. S. Army No. 100-14, Navy Spec. No. 39 P-16). This supersedes 100 SSC-(A) on *Ordnance Storage and Shipment Charts* which has been revised and is being printed by the Government Printing Office.

A new class of specifications for paper and other materials is now issued by the Federal Specifications Executive Committee. Issued in mimeographed form, they can be obtained without charge from the Federal Catalog Division, Room 572, Procurement Division Building, Washington, D. C.

In view of the national emergency and in the interests of unification of Government specifications, the Government Printing Office suspended for the duration of the emergency period the *p*H and folding endurance requirements in the specifications for all envelopes purchased by this office. The weights of some of the envelopes have been reduced; some envelope sizes, found no longer necessary, have been eliminated.

Improvements in Continuous Multistage Washing. J. P. Rich and J. H. Noble—This paper reviews best modern practice. It includes steps not yet worked out which will further simplify and reduce the cost of wash room operation. The latest method of sulphite washing also is outlined. Conclusion is that by the use of the best methods, the pulp can be washed clean, and that improvement in the wash room together with those already made in the causticizing and recovery departments will lower salt cake consumption to 150 lb. and result in cleaner pulp.

Efficient Reuse of Process Water. H. A. Morrison—The objective in most mills as operated a few years ago was to minimize loss of fiber when large volumes of water were discarded from each department. Now it is known that efficient removal of fiber commonly will permit direct reuse of the water in the same or in preceding steps of manufacturing, with consequent reduction of outside water demand . . . For best average results, it generally is deemed desirable to (1) introduce comparatively little outside water, (2) minimize slime formation by chemical treatment, (3) practice good housekeeping to periodically remove slime and dirt, and (4) discard continuously enough clarified white water to balance the net addition of outside fresh water . . . Many classes of equipment can be and are used in addition to or instead of vacuum filters to condition water for reuse. Slush thickeners, gravity deckers, several different types of pulp washers and thickeners, gravity settling tanks, to mention only a few, all have to be considered when planning a modern water conservation system.

Metaphosphate Increases the Washing Efficiency of Chemical Pulps. E. R. Lang and E. T. Laurin—The use of sodium metaphosphate

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in amounts less than 0.2 per cent based on the weight of pulp, in the washing of sulphate, soda, and sulphite pulps, realizes an economical saving of chlorine when the pulps are bleached and an incident increase in bleached pulp strength.

Paper Mill Operating Experiences with Accelerator Softeners and Clarifiers, A. C. Embshoff—Hundreds of Accelerator installations are now in service, treating almost every type of water for a variety of industrial and municipal usages. In the pulp and paper industry alone, equipment of this type is producing approximately 65,000,000 gallons per day of treated water for process purposes.

The Accelerator may be used advantageously for the clarification of turbid, contaminated, relatively soft surface supplies; for the softening of hard waters; or for simultaneous softening and clarification. Exceptional clarity of treated water produced, in many instances, makes filtration unnecessary with consequent important investment economies.

Conservation in and by Chlorination, R. B. Martin—Upon reduction in bleaching, and the mixing of bleached with unbleached pulps to meet the established brightness ceilings, an added burden has been placed on slime control treatments. In certain instances, increase in chlorine usage for slime control has made possible greater reductions in chlorine used for bleaching.

Efficient chlorination can play a part in conservation of more vitally needed materials, providing methods of application keep pace with changes in white water and mill systems.

Application and Maintenance of Pumping Equipment Associated with Water Treatment, A. T. Nielsen—The initial step in the proper application of pumping equipment is a correct and completely worded inquiry. The second step is the weighing of individual bids. The last step is proper installation.

The usefulness and life of a properly applied pump lies in the hands of the operator and maintenance crew.

Fiber Cans as Substitute Packages in Wartime, R. P. Bigger, F. H. Bopp, T. E. Dobbins—Conventional paperboard cans may be classified as either spirally wound or convolutely wound . . . Spirally wound containers normally are produced only in round form . . . In contrast to spiral cans, convolute cans may be produced in rectangular, round, oval, or other forms . . . The fiber can is economical, light in weight and strong; it can be

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ENGINEERS AND MANUFACTURERS

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made water vaporproof, waterproof, oilproof, greaseproof, acidproof, and alkaliproof; it can be provided with adaptable closures and, when properly made, it is an attractive package.

Development of Weatherproof Solid-Fiber and Corrugated Shipping Containers Designed for Overseas Shipment. E. R. Hankins—Shipping cases are required that not only stand up under exceedingly rough handling over long journeys, but which also can be unloaded from transports into the surf and stored in the open in all kinds of weather, from frigid Russia to the torrid heat of Africa . . . The mills have succeeded in producing a board that retains a good portion of its strength while being submerged in water and regains its strength upon drying . . . In addition to the water-resisting paperboards, an adhesive that would continue to perform under water was required. The starch manufacturers came through with a modified starch adhesive, obtained by the addition of urea-formaldehyde. This type of glue now is being used on both solid fiber and corrugated shipping cases . . . Tentative specifications issued by the office of the Quartermaster General, dated December 2, 1942, No. 93, provide for four groups of boxes involving both corrugated and solid fiber; designed to meet their requirements for the shipping of different commodities under various conditions . . . Copies of this specification are available upon request to the office of the Quartermaster General.

Tests on Fiber Containers—The Beach Puncture Tester. Sidney D. Wells, Arthur B. Kaplan, and Lewis R. Ayers—At the Annual Meeting of TAPPI in February, 1939, R. L. Beach (Beach, R. L., Puncture testing of box board. Tech. Assoc. Papers 22: 240, 1939; *Paper Trade J.* 108, No. 5: 30, July 13, 1939) described an instrument designed to test corrugated and solid fiber boards so as to ascertain their suitability for the packaging and transportation of merchandise without damage either in transit or in storage. Since the presentation of the paper, the instrument has been used as a guide in the design and control of the packaging and boxing of a wide range of products made by the General Electric Company; so far as is known, however, there has been no move toward its adoption as an official testing method.

During the past seven months, there has been under way at The Institute of Paper Chemistry a series of tests and studies on two rather extensive groups of corrugated fiber containers made by two manufacturers. The object of these studies was to obtain information to assist in the design of corrugated fiber containers, and to do so, substantially every type of testing instrument, machine, and method which had come to our attention was used.

The tests made upon the built-up boards were as follows: normal adhesion; Beach adhesion; H. & D. crush; bursting strength ("Jumbo" Mullen); Beach puncture; and Beach stiffness.

As a means for measuring the performance of the container, the following tests were made; compression test, top to bottom; impact test, Conbur tester; and small revolving drum test.

So far as they go in comprehensiveness and scope, these studies seem to indicate that the Beach puncture tester, and the methods used to break down the values obtained into stiffness and toughness, give promise of being a useful tool for ascertaining the importance and the magnitude of the various elements of design, material, and fabrication on the serviceability of fiber containers.

The Flat Crush Test. Pierre Drewsen—A recent proposal to incorporate a flat crush test in Rule 41 of the Consolidated Freight Classification as a measure of the quality of the corrugated medium has stimulated much thought and discussion about the merits of this test . . . One method of measuring flat crush test is the Hinde and Dauch Paper Company Tester which is described in complete detail in the *Paper Trade Journal* of March 10, 1938 . . . No official method or test specification for flat crush test exists in the paperboard industry . . . The inclusion flat crush test in Rule 41 would necessitate the adoption of an official test method. Before this can be done properly, the variables which affect the test, as performed in the laboratory, as well as those attributable to papermaking and combining factors should be thoroughly understood.

A Theory of Box Compressive Resistance in Relation to the Structural Properties of Corrugated Paperboard. John R. Little—A relationship between the top to bottom box compressive resistance and two properties of corrugated board is derived from the ordinary engineering formulae for columns. The properties of corrugated board which primarily affect box compressive resistance are the board compression strength and the stiffness factor of the board. The measurement of these two properties will indicate the ability of a box to withstand forces tending to distort or compress it.

Utilization of Cornstalks in the Manufacture of Paper and Paperboard. S. D. Wells and Roger L. Steller—Five tons of cornstalks have been shown to be capable of producing one ton of bleached fine-fibered pulp and 1.4 tons of non- and short-fibered material. The bleached fine-fibered pulp has been shown to be highly suitable for the manufacture of a wide range of papers. The non- and short-fibered fraction, after pretreatment with rods and washing, is capable of imparting bursting strength and stiffness to old paper stocks or virgin kraft pulp without the use of beating. The use of the dried and ground non- and short-fibered material as a molding powder for plastics also would contribute to the desirable and economical utilization of this agricultural waste.

Effect of Small Additions of Bleach Liquor on the Bacterial Content of Sulphite Pulp. John W. Appling and Bernard F. Shema—Sulphite pulps of low bacterial content can be produced by the action of 2 per cent bleach (on the basis of a 35 per cent bleach powder), provided the bacteria present have a low resistance to chlorine. If the bacteria present have a high resistance to chlorine, sulphite pulps of low bacterial content cannot be produced by exposure to either 2 or 8 per cent bleach. Sulphite pulps of low bacterial content can be produced by exposure to 16 per cent bleach, regardless of whether the bacteria present have a low or high resistance to chlorine.

Influence of Cooking and Bleaching upon the Chain Length Distribution of the Carbohydrate Fraction in Pulpwood. Joseph E. Atchison—An attempt has been made to ascertain the influence of the cooking and bleaching procedures upon the chain length distribution of the total carbohydrate fraction (holocellulose) as it exists in spruce wood.

The results show that the carbohydrate fraction as it exists in the wood (the average degree of polymerization of which is 1450) represents a rather heterogeneous material, consisting chiefly of portions of either very low or very high D.P. (degree of polymerization) with only a small percentage of intermediate values. On pulping, the very short chain material is degraded to varying degrees. As a result, the amount of material of medium chain length has increased. This equalization occurs to a greater extent in sulphate than in sulphite and soda pulping. On bleaching, further changes in the chain length distribution occur which, however, result in a more heterogeneous rather than a more homogeneous product.

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The streamlined form of the inner valve produces the flow pattern shown here. It is the reason users of the "1000" valve get maximum capacity when it is needed most and accurate pressure control even when production hits non-stop proportions and operating conditions really are tough.

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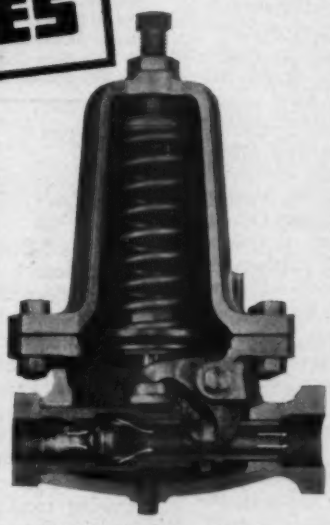

● Maximum capacity when needed most—accurate pressure control under toughest working conditions—those are points to carefully consider in selecting a valve to fully fit in with all requirements. You get them in the "1000" valve. Here are some actual operating results . . . "To maintain a good uniform quality and to get the utmost out of the machine in the way of production, sensitive pressure control is of prime importance. And, because the machine runs 24 hours a day, dependability is equally important. Your valve never missed a trick." Case No. 340 . . . "We had to have capacity and close regulation, but most of all we wanted a good dependable valve so we would lose no working time with the engine. We got all of that and more. This valve has given excellent service for almost five years without any service attention whatever." — Case No. 325.

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NEW CASH STANDARD *Remote* HYDRAULIC *Control*

This type 550 Remote Hydraulic Control may fit your needs as it is so dependably doing at present for aircraft manufacturers and aeronautical laboratories on engine test cells for controlling throttle position and mixture. IT TRANSMITS OSCILLATING MOTION WITHOUT MECHANICAL LINKAGE. To operate, depress button in control lever with thumb. This releases the automatic brake. Move control lever to any desired position, release button, and control is automatically locked in that position where it will remain indefinitely. The unit . . . a Type 550 Sender (above) and Type 550 Receiver (below) has positive hydraulic power in both directions—no springs, no cups on piston, it transmits the total force applied to the control lever. There is no lost motion in either direction. The lever of the Receiver moves 90 degrees. It can be indexed to any position. For easy mounting the bracket of the Receiver can be indexed to four positions. The Receiver can be installed above or below the Sender.

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The Relationship Between the Air and Oil Permeability of Paper, W. H. Lee—The oil permeability of many papers is not a constant but decreases as the oil flows through the sheet. The more permeable sheets show little or none of this effect, and the oil permeability is essentially constant. Air permeability appears to be a true constant.

The oil permeabilities of the paper studied were less than their air permeabilities.

The lack of constancy in the ratio of air to oil permeability indicates that the air permeability, although a characteristic constant of the sheet, cannot in general be used as an index of oil permeability.

The permeability of sheets filled with English coating clay or calcium carbonate was found to increase with increasing filler content. The effect of calcium carbonate was considerably greater than that of clay.

Packaging Requirements for Dehydrated Vegetables, J. R. Sanborn and G. J. Hucker—Preliminary findings on the suitability of available packaging materials, based on results obtained from a survey of nearly 200 different types of sheets, films, wrappers and containers, indicate that about 12 basic materials are unusually promising; approximately 20 additional types may find a place in the development of combination packages for dehydrated vegetables. The more satisfactory products consist of parchments, glassines, several grades of moisture-proof cellophane, plastic films, paper, paperboard and certain special combinations of materials. Nearly all of these sheets and films are laminated and coated or otherwise processed.

In spite of the successes that have been achieved, none of the available packages is sufficiently impermeable for the most perishable and unstable dehydrated vegetables such as carrots, cabbage, yellow sweet potatoes, and leafy vegetables, all of which are valuable sources of vitamins A or C. The controlling factors in these instances are temperature, moisture and oxygen.

Adequate elimination of oxygen is difficult to accomplish but with the development of compressed dehydrated vegetables and the modified methods of packaging that are now applicable, the solution of a number of problems, including air removal, may be facilitated considerably. There is a much better chance at present of avoiding the entrance of water and water vapor. However, under conditions which stimulate tropical situations, as to temperature and humidity (100 Fahr., 80 per cent R. H.), unstable vegetables, packed in any of the available packages, fail to retain palatability, color, or vitamins for longer than 3 months.

Partial list of "Paper Prevents Battlenecks" Exhibitors

American Can Company
American Viscose Corporation
Arkell Safety Bag Company
Army, United States
Beech-Nut Packing Company
Bigelow-Sanford Carpet Company
Bird & Son, Inc.
Brown & Williamson Tobacco Corp.
F. N. Burt Company, Inc.
Carpenter Container Corporation
Coast & Geodetic Survey, U. S. Department of Commerce
Colgate-Palmolive-Peet Company
Cross Paper Products Corporation
Container Company, The
Elmer Candy Company, Inc.
Ex-Lax, Inc.
Food Industries Magazine
Robert Gair Company, Inc.
Gardner-Richardson Company
Gaylord Container Corporation
General Cellulose Company, Inc.
General Mills, Inc.
General Printing Ink Company
Hill Packing Company
Hinde & Dauch Paper Company
Interchemicals Corporation (IPI)
Interstate Folding Box Company
Johnson & Johnson
Kalamazoo Vegetable Parchment Company
Keystone Envelope Company
Keystone Roofing Manufacturing Company
Kimberly-Clark Corporation
Larus & Brother Company, Inc.
Lederle Laboratories
Lily Tulip Cup Company
Marathon Chemical Company
Marathon Paper Mills Company
Matthias Paper Corporation
Menasha Products Company
Michigan Research Laboratories, Inc.
Modern Packaging Magazine
Mono Service
Monsanto Chemical Company
Mutual Paper Company, Inc.
Myles Salt Company
National Association Service
Old Dominion Box Company
Oxford Filing Supply Company
Paper Shipping Sack Manufacturers' Ass'n
Quikut Home-Papers
F. A. Read, Inc.
Reynolds Metals Company
TAPPI, Kalamazoo Valley Section
Thomas M. Royal & Company
Sinclair & Valentine Company
Sisalkraft Company
Socony-Vacuum Oil Company
Sonoco Products Company
Southern Pulpwood Conservation Ass'n
Stecher-Traung Lithograph Corporation
Thilmany Pulp & Paper Company
C. E. Twombly Company
United Drug Company
U. S. Department of Commerce
U. S. Envelope Company
War Department:
Camouflage Division
Chemical Warfare Service
Ordnance Department
United States Army
Waterbury Paper Box Company
Westinghouse Elec. & Mfg. Company
Wrenn Paper Company

Effect of Sulphate Mill Wastes on Fish Life, J. A. Extrom and D. S. Farner—The Sulphate Waste Disposal Committee of Wisconsin instituted a program during the summer of 1942 which had as its object, the effect of various sulphate mill wastes on fish life. The work was carried on in an especially constructed laboratory at the mill of the Tomahawk Kraft Paper Company so that actual mill operating conditions could be maintained insofar as practical.

The experiment demonstrated that bass, bluegills, and sunfish were able to survive in a healthy condition in the stream dilution of any of the sulphate mill wastes studied but that at a concentration of sewage 50 to 100 times that of the waste normally present in the stream, these wastes are definitely toxic to the above species.

Reuse of Old Papers, Frederick C. Clark—The growing shortage in bleached sulphite and sulphate pulps will be severely felt by the paper industry in 1943. This shortage in raw materials for the manufacture of paper may be alleviated by an increase in the use of old white papers, magazines, and book stock for reuse into white pulps.

Approximately 35 per cent of all paper and board made comes back for reuse. If this could be increased to 45 per cent, it would result in the collection of 1,500,000 tons of additional material, and this would produce over 100,000 tons of deinked white pulp and 1,000,000 tons of material suitable for the manufacture of board and containers.

Some mills with extremely small additions to their present equipment could produce good deinked old paper stock.

Features of Adjustable-Speed Electric Drives to Meet the Requirements of the Paper Industry, R. R. Baker—The a-c. wound rotor industrial motor, although available in all required capacities, is limited in application to auxiliary or paper processing drives requiring not more than 2 to 1 speed range on applications where close speed regulation is not important.

The constant voltage shunt wound d-c. motor drive which is available in all required capacities provides very good speed regulation for speed ranges up to 4 to 1, and is suitable for application to paper processing and auxiliary machine drives.

The adjustable voltage d-c. drive system, which is available in all required capacities, provides a very good speed regulation over an operating

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Synthetic Rubber Already [illegible] for Users of Mechanical Rubber Goods

War production is up threefold. But the vital rubber stock pile is dwindling fast. This is the year of crisis in rubber.

There is only one solution . . . the production of synthetic rubber in steadily increasing tonnages . . . synthetic rubber to take over jobs once handled by natural rubber . . . to perform new tasks, serve in new applications created by wartime need.

One of the first synthetic rubber plants in the Government's program was built and is being operated by United States Rubber Company . . . another soon will be in production.

Our engineers have been working with synthetic rubber since 1921. During this period they have learned that no one synthetic should be used for all types of mechanical rubber goods. They have found where and how synthetic is superior to natural rubber, where it is equally as good, where it falls short. They know what uses each of the five basic commercial types of synthetic rubber is best suited for — Neoprene, Buna-S, Buna-N, Butyl, or Thiokol—and how to compound the specific synthetic rubber for the specific task. U. S. Rubber has used all five types and knows which one to select for the performance required.

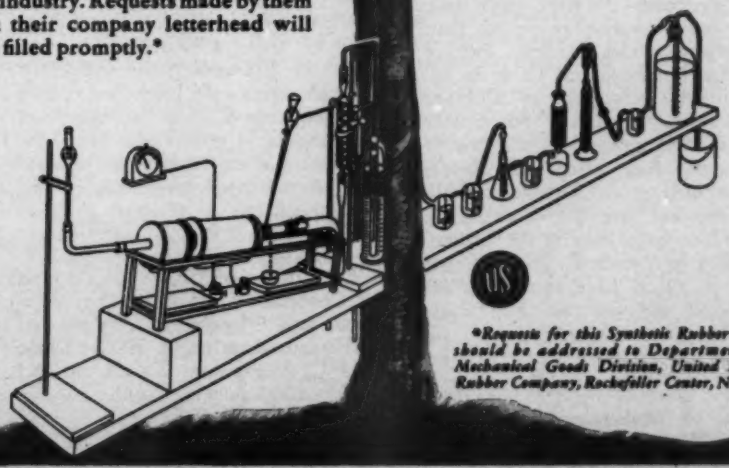
Information based on the results of vast experiments and practical applications of synthetic rubber has been incorporated in a new comprehensive book, *The Five Commercial Types of Synthetic Rubber.*

This informative book traces the history of synthetic rubber from the earliest experiments of Michael Faraday to the present. It discusses each of the basic types of synthetic rubber, tells where it has been used successfully in United States Rubber Company products, and compares its properties with natural rubber. It tells how synthetic rubber is made. It is a detailed answer to the most vital question of the day.

We feel that *The Five Commercial Types of Synthetic Rubber* is a publication of real importance to men of industry. Requests made by them on their company letterhead will be filled promptly.*

The successful use of synthetic rubber in mechanical rubber goods and the assurance of fully dependable service depend largely upon the skill of the manufacturer and compounder. Each of the five basic commercial types of synthetic permits a myriad of variations.

The United States Rubber Company has been developing and improving rubber products for one hundred years. Today, the same vast resources for research and development that resulted in some of the most spectacular achievements in the rubber industry are being devoted to the problem of synthetic rubber. A great backlog of knowledge already has been built. More is being constantly added.



*Requests for this Synthetic Rubber Book should be addressed to Department 14 Mechanical Goods Division, United States Rubber Company, Rockefeller Center, N. Y. C.

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speed range as great as 40 to 1, and may be supplemented with auxiliary regulating equipment for use with the paper forming machine drive where accurate speed regulation is required.

The d-c. series variable voltage system which is limited to capacities of 15 hp. or less and which is the simplest form of d-c. drive, provides satisfactory speed regulation for application to paper processing or auxiliary drives required to operate over a speed range of 10 to 1 or less.

The adjustable speed d-c. drive utilizing an electronic power rectifier in place of motor generator set which is limited to capacities of 5 hp. or less, provides satisfactory speed regulation over a 20 to 1 speed range; however, it is only recommended where the elimination of the motor generator set is desirable.

Comparison of Calender Treatments. Albert Yraola—No. 1 white patent coated paperboard was calender-treated on the board machine with solutions of chlorinated starch, tapioca starch, and polyvinyl alcohol, for purposes of comparison. The concentrations of the solutions were increased until a viscosity above that practical to apply on a board machine was reached. The board was tested for Dennison wax pick, surface oil absorbency, air porosity, and by printing on a Vandercook proofpress.

All three materials produced a printing surface superior to that of plain water, from the viewpoint of users of patent coated paperboard, the improvement being more marked as the solution concentrations increased.

Dyestuff Absorption by Fillers and Their Effect upon the Color of Filled Papers. Otto Kress and Peter Trucano—Primary clays have better dye absorptive properties than any secondary clay studied. Particle size is not an important factor in determining the adsorption of acid—or basic—dyestuff absorption but it does have an effect upon the adsorption of direct dyes. Inert fillers (zinc oxide, zinc sulphide, etc.) completely adsorb direct dyes but have little or no affinity for acid or basic dyes at the concentration of dye studied. Diatomaceous earths or silicas have an affinity for basic dyes but not for acid dyes; amorphous silicas have a greater adsorptive power than the crystalline type.

Use of Melamine Resins for Beater Wet Strength. C. S. Maxwell—A new method of producing wet strength paper by the use of a melamine resin is described. The resin is prepared in such a manner that it is retained by the stock in the beater or at any other point of application in the papermaking operation prior to sheet formation. As a result of the unique properties of the resin complex, a high retention of the resin is secured and wet strength is imparted to the finished sheet.

Metallographic Examination of Plant Equipment. Murray M. Rubin—The purpose of this paper is to stress the importance of metallography in industrial plant equipment utilization and conservation. A simple and inexpensive method for study of this subject is presented briefly, together with a differential atlas of photomicrographs of normal and defective structures of metals and alloys employed in pulp and paper mill design, construction, maintenance, and operation.

Ultimate Strength of Pulp Fibers and the Zero-Span Tensile Test. James d'A. Clark—The tedious direct measurement of the ultimate average strength of fibers may be replaced, for most purposes, by the zero-span tensile test. The test is reproducible and rises only moderately with beating. The ratio between the normal and zero-span tensile strengths gives a fair indication of the adhesiveness of the fibers.

The Resistance of Sized Paper and Paperboard to Water at Elevated Temperatures. Philip W. Codwise—The test method employed utilized water of ordinary purity as recommended by Carson (Carson, F. T. "Measurement of the Degree of Sizing of Paper," Technologic Paper Natl. Bureau of Standards No. 326, Sept. 11, 1926) in his investigation of size testing methods. This is a flotation procedure.

When employed near the boiling point of water, this method is most useful in determining the overall or internal sizing of hard-sized paper and paperboard. For all purposes requiring rapid results and where the product is to be exposed to penetration at elevated temperatures, this method of test is of great practical value.

Estimation of Carbonyl Groups in Chromic Anhydride Oxycelluloses and Oxystarches by Means of Hydroxylamine. E. K. Gladding and C. B. Purves—Simple carbonyl compounds condense with aqueous hydroxylamine hydrochloride to give quantitative yields of oximes, as estimated by the titration of the liberated hydrochloric acid with alkali, either electrometrically or with brom phenol as an indicator. The condensation of the hydrochloride with reducing sugars, at room temperature and *p*H 3.5 to 5, was found to be a first order reaction proceeding 95 to 100 per cent to completion. Those sugars that condensed completely within 1.5 hours were said to have "fast" carbonyl groups and those, like glucose or the keto-sugar fructose, that required 12 to 18 hours had "slow" ones. Although the two kinds of aldehyde groups present in periodate oxycellulose or oxystarch reacted at different rates, both fell in the "fast" category and were estimated to within 5 per cent.

The method was then tested with products made from linters swollen until about 20 per cent of their mass was known to be immediately accessible to the oxidant, which was chromic anhydride in acetic acid-acetic anhydride or in 0.2 N sulphuric acid at 20 C. Pre-swelling made it possible to oxidize up to about 20 per cent of the linters to the equivalent of one oxygen atom per glucose residue without producing appreciable amounts of water-soluble degradation products. Although the oxidant consumed was almost entirely represented by the insoluble oxycelluloses, not more than 75 per cent was accounted for by their content of acidic groups and "fast" carbonyls. Chromic anhydride oxycelluloses may therefore contain "slow" carbonyl groups, possibly of a ketonic nature, that were not quantitatively estimated by the method used.

The data for starch oxidized in aqueous sulphuric acid were similar to those for swollen cellulose but no oxidation occurred with the acetic acid reagent. This unexpected result was tentatively attributed to the failure of the latter to penetrate beyond the minute, colloidal surface of the powdered but unswollen starch.

Flow Properties of Coating Clays at High Rates of Shear. K. A. Arnold—A procedure has been developed for measuring the flow properties of coating clay slips at rates of shear in the range of 8.0×10^4 reciprocal seconds, which is in the range of shear produced in high speed coating machines.

In general, the flow properties of clay slips were found to change considerably with the amount of mechanical work to which they were subjected. On ball milling, the slips showed an initial decrease in viscosity to a minimum point, then a gradual increase in viscosity over several hours of milling. The test for hydration of the clay particles indicated a gradual increase in this property during milling. Greater changes took place during milling in slips containing comparatively low percentages of the dispersing agent. In

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MICROORGANISMS in a paper mill are trouble enough in ordinary times. Now that time, materials and production capacity are all at a premium they spell double trouble.

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Chemically stable, non-corrosive to metals, non-volatile, practically odorless, Santobrite is well suited to the paper industry's need for an anti-slime treatment effective against *both* fungi and bacteria. It is produced in both powder and briquette forms, requires no expensive apparatus for satisfactory application and, when properly handled, its use involves no health hazard to mill operators or consumers of the mill product.

For positive protection from 0.1 to 1.0 pounds of Santobrite are required per ton of paper produced depending on the extent to which your water system is closed, the characteristics of your stock and the quality of your water supply. The cost of treatment varies from 1½ to 18 cents per ton of paper or pulp.

Fortunately, limited amounts of Santobrite, Monsanto's highly effective fungicide and bactericide are still available on priority for continuous anti-slime treatment.

We suggest that you write or wire for the latest information on availability, stating fully (1) the uses for which you require Santobrite and (2) the ultimate consumer of your product in which Santobrite is to be used. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, St. Louis, Missouri.

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"E" FOR EXCELLENCE... the Army-Navy "E" burgee with two stars, "representing recognition by the Army and the Navy of especially meritorious production of war materials" over a two-year period, flies over Monsanto.

SERVING INDUSTRY... WHICH SERVES MANKIND

the preparation and application of coating clay colors, the mechanical work applied to the color should be carefully controlled in order to produce uniform coating.

By a careful selection of the amount of work applied, the amount of dispersing agent used, and the concentration of the clay, it was possible to prepare slips from different clays which showed very similar flow properties.

The Photochemical Stability of Papers. Herbert F. Launer and William K. Wilson—Papers were irradiated with a carbon arc through a filter which completely eliminated infrared, and ultraviolet shorter than approximately 330 millimicrons. Sheet temperature was kept near 30 C. during irradiation, through contact with a thermostated metal backing, thereby eliminating heat effects, shown otherwise to overshadow light effects, using intense sources.

Yellowing of papers (without lignin) commonly ascribed to light was found to result from heat or age, but not light; papers bleached when heat effects were eliminated during irradiation. Even lignified paper was bleached by light in nitrogen.

Paper scorched brown at high temperatures or yellowed at 100 C., and yellow papers (250 years old) were bleached by light.

Lack of oxygen inhibits but does not altogether prevent photochemical deterioration. The role of water vapor differs fundamentally for cotton and wood pulp paper.

Lignified paper is very unstable to light. Printer's ink extensively protects paper.

Irradiated papers are subsequently less stable in the dark than those not previously irradiated.

The order of photochemical stability of papers was as follows: new rag, refined sulphite, old rag, soda-sulphite, and newsprint. The light stability of new rag papers was greatly affected by acid and rosin whereas that of old rag and soda-sulphite was only slightly affected, in contrast to heat stability, for which *p*H is important for all fibers. Newsprint, made neutral with $NaHCO_3$ showed a large increase in light stability. Rosin did not seriously affect stability of any papers as long as acidity was low.

Performance of Evaporators. J. R. Rubush and G. E. Seavoy—Reducing mill capacity involves problems of economical operation by rearrangements which should receive as much thought and study as increasing the production rate. There are optimum interrelated operating conditions in pulp washing, evaporation and recovery furnace operation for each particular mill and which result in minimum costs.

The importance of instrumentation control and the interpretation of resultant quantitative data is stressed in the use of such information to anticipate process troubles such as loss of capacity due to scaling, fouling and corrosion. Methods for cleaning the tubes on both vapor and liquor sides are described.

The reason why no specific conclusions can be deduced from a wealth of accumulated operating data on tube life is that the complexity of variables and inter-relationships involved have not been quantitatively evaluated. The use of partially chromium-plated tubes holds promise of approximately doubling the life of low carbon steel tubes.

Drying Rates for Newsprint. W. G. MacNaughton—The report is based on data compiled in a News Print Service Bureau study of the dryer section of newsprint machines covering 40 machines in 17 plants.

The speed of the machines ranges from 703 to 1,400 fpm and the weight of water evaporated per hour per inch of width is from 72.3 pounds to 136.3 pounds, average 118.1 pounds.

The water evaporation rate calculated according to TAPPI method ranges from 1.52 to 2.76 pounds per hour per square foot of total heated dryer surface, the average being 2.072 pounds.

The temperature of the steam in the dryers ranges from 218 to 263 Fahr., and when the steam temperature is corrected to the average water evaporation rate the range is from 226 to 259 Fahr. with an average corrected temperature of 238 Fahr.

Other factors which are known or believed to influence the steam temperature are: degree of coating on the dryer surfaces; intimacy of contact of the paper to the dryers as indicated by the dryer felt tension; completeness and regularity of evacuation of the dryers of condensate and air; and degree of ventilation of the dryer section for removal and absorption of water vapor.

Rayon and the War. Dan B. Wicker—Since the beginning of the current conflict rayon has contributed to a highly important extent to the country's general welfare . . . Under the influence of dwindling imports, the American industry took up the responsibility of domestic demands to produce 451,204,000 pounds of yarn and 122,025,000 pounds of staple fiber in 1941; in 1942, the estimates are 475,000,000 pounds of yarn and 155,000,000 pounds of staple fiber.

Before the present emergency arose, special types of rayon had been developed which are characterized by their high strength, toughness and stability. Perhaps the most spectacular contribution is that of heavy duty rayon cord tires. Another adaptation of strong rayon yarn is use in fabrics for self-sealing gas tanks; the fabric serves as an effective support for the soft-sealing plastic. Strong rayon yarns also are used in making fabric that has been adopted by the Army as standard equipment for parachute troop uniforms.

War economy has created a demand for large quantities of fabrics of standard shades having a high degree of color fastness. Rayon manufacturers have produced shades of such fastness that the color can be removed or faded only by treatments so drastic as to destroy the utility of the material.

Wood Pulp Allocation and 1943 Wood and Pulp Prospects. Oliver M. Porter—The objectives of pulp allocation are: to maintain production; to provide enough pulp of the right kind, at the right place, to insure essential war and civilian production; to equalize inventories among consumers; and to prevent unnecessary cross-hauling.

The Wood Pulp Allocation Industry Advisory Committee (15 present members) does not allocate pulp. Its function is to review the allocation set-up proposed by the Pulp Unit and to make recommendations as to any changes which may seem necessary or desirable. These are then reviewed by the Pulp Unit before approved shipping schedules are issued by the Director of Industry Operations.

There are two things which you, your companies, can do which will help this pulp allocation tremendously. First, see to it that your PD 290 forms are filed promptly, as required under M-93. Second, be sure that your figures, as reported to the WPB are correct.

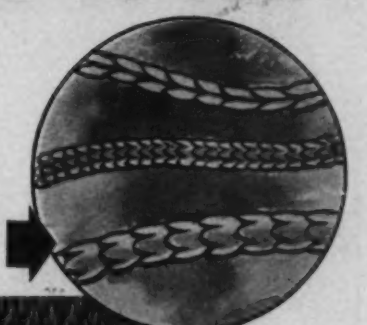
The WPB is now asking for information as to the furnishes used in the production of the papers and paperboards which you manufacture. With the wood situation becoming more and more critical, it is absolutely necessary for the Pulp and Paper Division to have this information in order that, in its pulp allocation, it may stretch to the limit the use of all available fibers in the manufacture of essential war and civilian commodities.

Best present estimates for pulpwood indicate an overall reduction of about 25 per cent from the 1942 supply for 1943. It is probable that imports of wood during 1943 may total 1,700,000 rough cords from Canada. There is

Wool Fibers

FROM FLEECE TO FELT

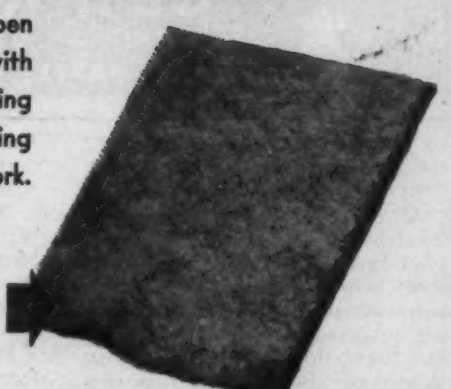
Seen through the microscope the wool fibers used in the manufacture of Hamilton Felts look like rat-tail files, fairly bristling with rough scales from end to end. The more scales to the fibers the more costly the fleece.



These fibers are spun into yarns and woven into cloth of pre-determined patterns, such as this.

When the cloth is removed from the loom and immersed in pure, clear warm water, the scales on the fibers open like petals of a flower and interlock with the scales on adjoining fibers. • Revolving rollers press the scales shut again, anchoring all fibers together in a perfect net-work.

Result? Shrinkage. Possibly as much as 50% of the loom width. But this shrinkage of area is added to the fullness (thickness) of the cloth. The finished felt looks like this.



● One reason why Hamilton Felts are fuller, stronger and better is because they are manufactured of scalier, stronger, better fleeces. From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

Helen Stevens, Olympic Games record holder, now operates a Clark Carloader in the Shipping Department of the St. Louis Plant, Airplane Division, Curtiss-Wright Corporation. Miss Stevens' mark of 11.5 seconds for the 100-meter dash remains unequalled.

GANGWAY!

For the second shift operator. She's ready for quick action — to load or unload vital materials of war.

CLARK FORK TRUCKS

gas or battery powered, hold to time table timing — leave and arrive at stations on schedule to maintain schedules.

Pick, lift and tier loads of 1000 to 7000 lbs.

WRITE TODAY — OUR ENGINEERS ARE READY TO SERVE YOU.

CLARK TRUCTRACTOR

DIVISION OF CLARK EQUIPMENT COMPANY

BATTLE CREEK, MICHIGAN, U.S.A.

some possibility of this amount being augmented by imports from countries other than Canada and Newfoundland.

At the 1942 rate of conversion, wood to pulp, this would indicate a 1943 domestic pulp production of only about 8 to 8½ million tons of new pulp—as compared with 10 million tons produced last year. It is probable that 1943 pulp imports will just about balance our 1943 exports plus non-paper pulp consumption, which has been steadily increasing, particularly nitrating pulp for explosives.

◆

MOVE TO CLARIFY ESSENTIALITY OF PULP AND PAPER

The American Paper and Pulp Association has been negotiating with the War Production Board and the War Manpower Commission to curb the unrest threatening the industry as a result of published lists of non-deferable activities.

The paper and pulp industry was not among those listed as "non-deferable," which, by implication, classifies it in the deferable or essential class. However, the situation invited much misinterpretation, and to stem the confusion which might result, E. W. Tinker, executive secretary of the American Paper and Pulp Association, recently sent telegrams to Donald M. Nelson, chairman of the WPB; Joseph L. Weiner, Office of Civilian Supply, WPB; and Paul V. McNutt, War Manpower Commission, pointing out the serious aspects of the situation and asking that the essentiality of the industry be more clearly stated.

Mr. Tinker received a prompt reply from the War Manpower Commission written by Lawrence A. Appley, executive director. Mr. Appley emphasized the fact that it should be specifically noted that pulp and paper manufacture is *not* included in the non-deferable list. He further stated that the Association would be performing a service to the War Manpower Commission by informing the industry of this fact.

An appeal similar to that made by Mr. Tinker was sent to the same authorities by Oliver M. Porter, executive director of the U. S. Pulp Producers' Association, which communication drew substantially the same reply.

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COLLEGE ALUMNI LUNCHEON MEETINGS

During the week of February 15, the alumni of three colleges met for their annual luncheon meetings. Alumni from the *University of Maine*, the *Massachusetts Institute of Technology*, and the *New York State College of Forestry*, usually are well represented at the TAPPI meetings.

This year the luncheon of the New York State College of Forestry alumni featured a special presentation in honor of Professor C. E. Libby, head of the Pulp and Paper Department of that school. Professor Libby has been with the College for over 20 years, and in appreciation of the services he has rendered to the College, the paper industry, and the students who have been under his tutelage, his fellow alumni presented him with a gift and a scroll.

In a few remarks following the presentation, Professor Libby stated that the work conducted by the New York State College of Forestry will be continued, although it has been somewhat affected by the War. In recognition of the importance and training given to students, the Army has classified the Pulp and Paper Division as an engineering course so that students not holding reserve commissions will be given a deferred status. In addition to the regular college work, it was stated that Professor Libby and his staff are co-operating with the War Department in problems concerning pulp and paper products.

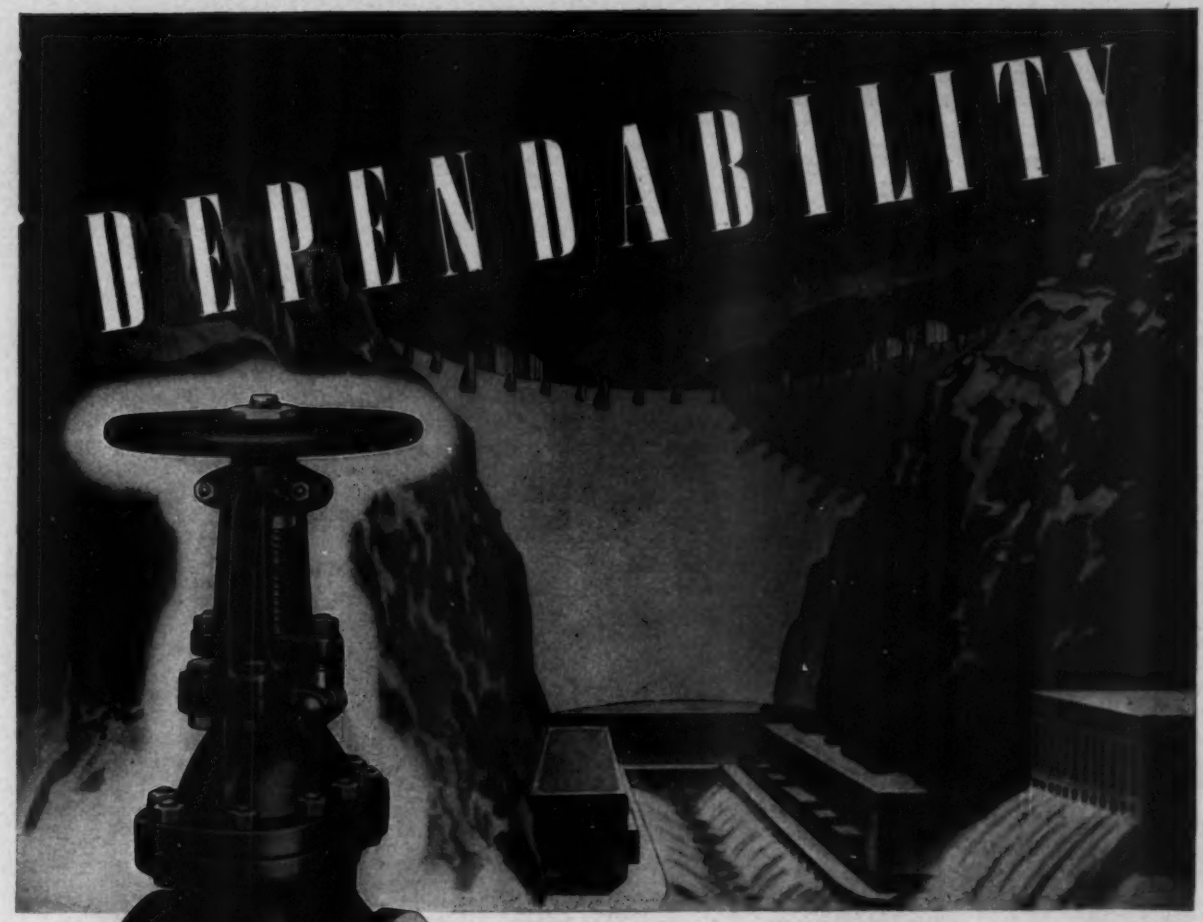


Fig. 1793—A large size Iron Body Bronze Mounted Gate Valve with flanged ends, outside screw rising stem, and taper wedge solid disc. Made in sizes, 2" to 30", inclusive, for 125 pounds W. P.

Also available with taper wedge double disc—Fig. 1444—sizes 2" to 12", inclusive.

The complete line of Powell Valves includes Globes, Angles, Gates, Checks, Reliefs, Y's, Non-returns, etc., in bronze, iron, steel, pure metals and special alloys to handle ever-increasing pressures and temperatures.

Millions of human beings depend on Boulder Dam to perform the function for which it was designed.

In the various processes employed in paper making, valves must perform many important functions. And above all they must perform dependably.

For nearly a century Powell Engineering has been designing valves to meet all requirements of the Paper Industry. And Powell Engineering, Powell Materials and Powell workmanship have made these valves above all things—*dependable*. That's why today so many of the leaders in this industry look to Powell for today's valve engineering requirements.

The Wm. Powell Company

Dependable Valves Since 1846

Cincinnati, Ohio

POWELL VALVES

Divisional Group Meetings

Writing Paper Manufacturers Association

Colonel C. M. Piper of the Industry Council, Office of Price Administration, Washington, addressed the 82nd annual meeting of the Writing Paper Manufacturers Association on Tuesday, February 16, in the Waldorf-Astoria Hotel, New York, on the subject of "Inflation." Other speakers at the meeting were Harold T. Martin on "The Labor Outlook" and Morris C. Dobrow, executive secretary of the Association, who spoke on "War and Postwar Problems Affecting the Writing Paper Industry."

John D. Zink, president of the Strathmore Paper Company, West Springfield, Mass., was re-elected to serve his second term as president of the Association. Mr. Zink in his annual report dealt with the importance of developing the right kind of relationship and teamwork between management and Government officials.

H. H. Hanson, of W. C. Hamilton & Sons, Miquon, Pa., and M. D. Bardeen, of the Lee Paper Company, Vicksburg, Mich., were elected vice presidents for the ensuing year, and M. C. Dobrow was re-elected executive secretary and treasurer, and G. V. Johnson was again elected assistant secretary.

The Executive Committee of the Association chosen for 1943 consists of the following: President Zink, Vice Presidents Hanson and Bardeen; H. R. Baldwin, Hammermill Paper Company, Erie, Pa.; G. H. Beckett, Beckett Paper Company, Hamilton, O.; E. F. Bellack, Fox River Paper Corporation, Appleton, Wis.; H. V. Burgee, Parsons Paper Company, Holyoke, Mass.; D. D. Coffin, C. H. Dexter & Sons, Inc., Windsor Locks, Conn.; Bruce Crane, Crane & Co., Inc., Dalton, Mass.; I. N. Esleeck, Esleeck Manufacturing Company, Turners Falls, Mass.; W. J. Garrity, The Munising Paper Company, Chicago, Ill.; A. C. Gilbert, Gilbert Paper Company, Menasha, Wis.; T. A. Hendry, The Mead Corporation, New York; J. E. Holmes, Chemical Paper Manufacturing Company, Holyoke, Mass.; E. C. Reid, American Writing Paper Corporation, Holyoke, Mass.; A. C. Remley, Nekoosa-Edwards Paper Company, Port Edwards, Wis.; F. H. Savage, International Paper Company, New York, and W. B. Zimmerman, The Maxwell Paper Company, Franklin, O. President Zink is chairman of the Executive Committee.

At the annual meeting of the Bristol Board Group of the Writing Paper Manufacturers Association, held on February 15, H. W. Tunstall, of Wheelwright Papers, Inc., was elected chairman of the Group, together with a governing committee consisting of the following: Mr. Tunstall, Kendall Wyman, of the Champion Paper & Fibre Company, vice chairman; Norman Harrower, of Linton Brothers & Co.; J. E. Holmes, of the Chemical Paper Manufacturing Company, and R. M. Swaney, of the Franklin Paper Company. Mr. Holmes retired from the chairmanship after having served the last two years.

The Cover Paper Group of the Writing Paper Manufacturers Association met in annual session on February 17 and W. W. Langtry, of the District of Columbia Paper Mills, was elected chairman of the Group, along with the following governing committee: M. A. Park, The Marvellum Company, vice chairman; G. H. Beckett, The Beckett Paper Company; A. E. Frampton, Hammermill Paper Company, and R. H. Morrill, Chemical Paper Manufacturing Company. Mr. Frampton retired from the chairmanship after having served in that capacity for two years.

Newsprint Manufacturers Association

Harold S. Smith, of the Maine Seaboard Paper Company, was elected president of the Newsprint Manufacturers Association of the United States at the annual meeting of that organization in the Waldorf-Astoria Hotel on February 16. J. D. Zellerbach, of the Crown Zellerbach Corporation, was elected vice president, and the following were elected Executive Committee members: John L. Hobson, St. Croix Paper Company; E. L. Kurth, Southland Paper Mills, Inc.; Samuel Pruyn, Finch, Pruyn & Co., and John H. Smith, Hawley Pulp and Paper Company. R. S. Kellogg was re-elected treasurer, and Louis W. Adams was again elected secretary.

Kraft Paper Association

The annual meeting of the Kraft Paper Association was held Tuesday afternoon, February 16, in the Jansen Suite of the Waldorf-Astoria Hotel, following a meeting of the Executive Committee the same morning. W. J. Dixon, vice president of the St. Regis Paper Company, was elected president for the ensuing year, and J. L. Madden, of the Hollingsworth & Whitney Company, was elected vice president. The Executive Committee elected is composed of the following: W. H. Anders, J. M. Arndt, H. P. Carruth, H. S. Daniels, E. S. French, J. H. Hinman, R. A. McDonald, S. M. Phelan, Jr., C. W. Smith and N. S. Stone.

Dernell Every was re-appointed as secretary-treasurer, and T. K. Heston was appointed assistant secretary-treasurer.

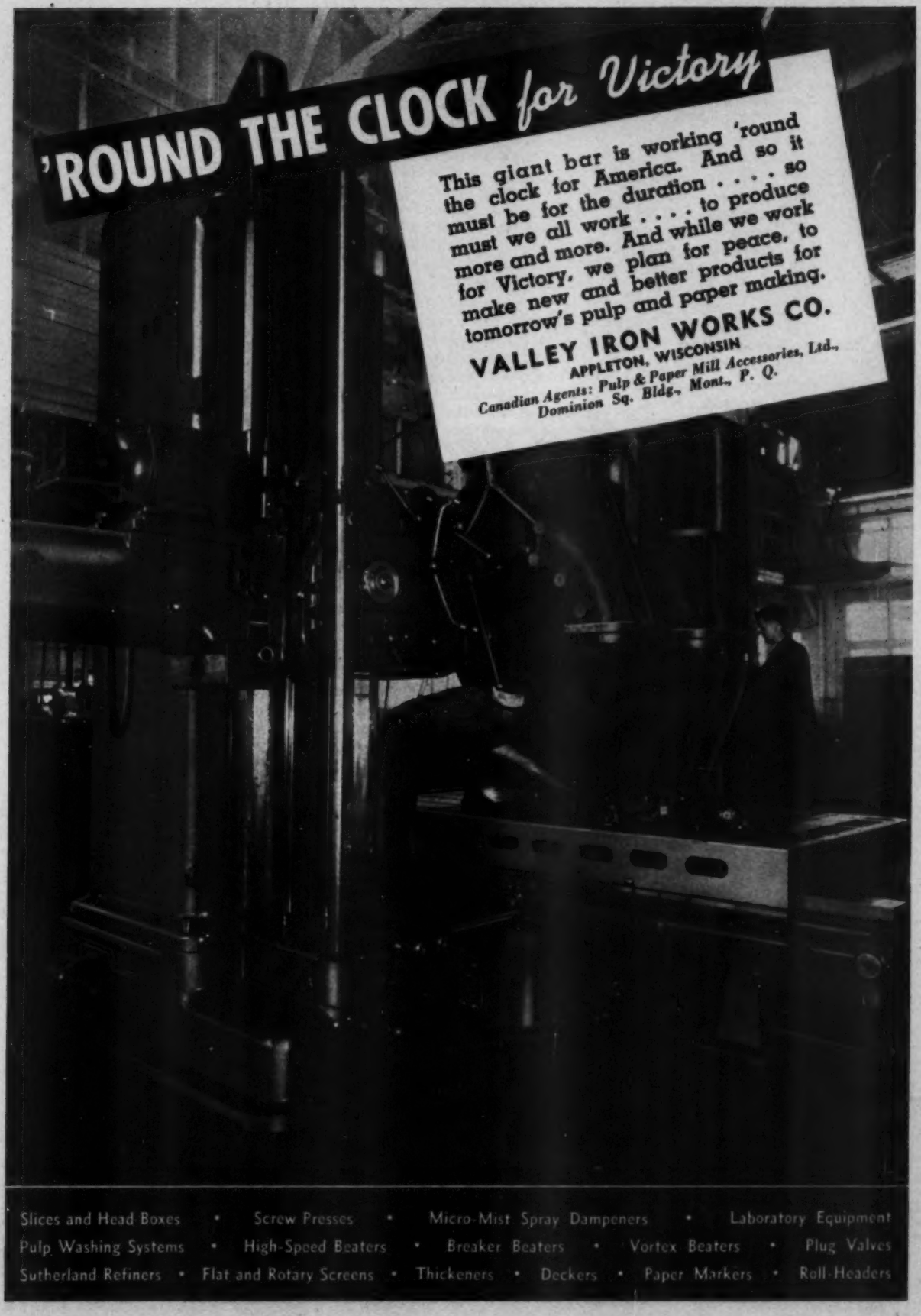
Glassine and Greaseproof

The Glassine and Greaseproof Manufacturers Association held its annual meeting on February 16 in the Waldorf-Astoria Hotel, and Robert F. Nelson, of the Glassine Paper Company, was re-elected to serve a second year as chairman of the Association. The following Executive Committee was elected: Folke Becker, Rhinelander Paper Company, Rhinelander, Wis.; Paul E. Hodgdon, Deerfield Glassine Company, Monroe Bridge, Mass.; Harry B. Kuhns, Nicolet Paper Corporation, Depere, Wis.; Paul F. More, Westfield River Paper Company, Russell, Mass., and J. Lawrence Riegel, Riegel Paper Corporation, New York. Thomas J. Burke, of New York City, was again named secretary and treasurer.

Sulphite Paper Manufacturers

At the annual meeting of the Sulphite Paper Manufacturers Association on February 15 in the Jansen Suite of the Waldorf-Astoria Hotel, Edgar W. Kiefer, president of the Port Huron Sulphite & Paper Company, Port Huron, Mich., was elected general chairman of the Association, succeeding Fred W. Cole, of Fraser Industries, Inc., New York. Mr. Kiefer is widely known in the industry, having been connected with his present company for many years. He has already served a term as general chairman at the time the Association was reorganized in 1933.

The following were elected to the Board of Governors: Mr. Kiefer; John E. Alexander, Nekoosa Edwards Paper Company; Fred W. Cole, Fraser Industries, Inc.; Gilford Henderson, Brown Company; Walter B. Merlin, Hollingsworth & Whitney Company;


'ROUND THE CLOCK for Victory
This giant bar is working 'round the clock for America. And so it must be for the duration . . . . so must we all work . . . . to produce more and more. And while we work for Victory, we plan for peace, to make new and better products for tomorrow's pulp and paper making.
VALLEY IRON WORKS CO.
APPLETON, WISCONSIN
Canadian Agents: Pulp & Paper Mill Accessories, Ltd., Dominion Sq. Bldg., Mont., P. Q.
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Pulp Washing Systems • High-Speed Beaters • Breaker Beaters • Vortex Beaters • Plug Valves
Sutherland Refiners • Flat and Rotary Screens • Thickeners • Deckers • Paper Markers • Roll-Headers

Harold O. Nichols, Crown Zellerbach Corporation; Fred P. Pandow, Consolidated Water Power & Paper Company; Rufus L. Sisson, Jr., Racquette River Paper Company; John Stevens, Jr., Marathon Paper Mills Company; George Stuhr, Southern Kraft Division of the International Paper Company, and Rufus I. Worrell, Mead Sales Company.

The following were elected vice chairmen: George Stuhr, Unbleached Group; Rufus L. Sisson, Jr., Manila Group; Fred P. Pandow, Bleached Group, and Harold O. Nichols, Machine Glazed Group.

The Tissue Association

The Tissue Association elected R. B. Stevens, of the Stevens & Thompson Paper Company, Greenwich, N. Y., president, succeeding J. M. Conway, of the Hoberg Paper Mills, at its annual meeting on February 15 in the Waldorf-Astoria Hotel. John McEwan, of the Mohawk Valley Paper Mills, Little Falls, N. Y., was elected vice president, and B. F. Picola, of the Gotham Tissue Mills, Salem, N. Y., was elected treasurer. Ross A. Fife, of New York, is secretary and assistant treasurer of the Association.

The Board of Governors elected is composed of J. M. Conway, A. B. Hansen, Grafton Houston, E. E. Grant, John McKirdy, B. F. Picola, R. B. Stevens, Norman Seagrave, B. E. Reider, Joseph Hartman, John McEwan, R. G. Fairburn, P. M. Allen and R. A. Montieth.

Three speakers addressed the annual meeting, Col. Charles M. Piper, member of the Industry Council of the OPA; Lawrence H. Selz, publicity counsel, and E. W. Tinker, executive secretary of the American Paper and Pulp Association.

Groundwood Paper Manufacturers Association

The annual meeting of the Groundwood Paper Manufacturers Association, originally scheduled for February 15, was postponed until February 17 owing to trains arriving so late from the West. An all-day meeting was held, interrupted by a luncheon. E. G. Murray, of the St. Regis Paper Company, was re-elected president of the association for the ensuing year; E. G. Bennett, of the Escanaba Paper Company, was re-elected Western vice president, and P. A. Mahony, of the International Paper Company, was again chosen Eastern vice president.

"If the wood situation is so critical that it is imperative that wood fiber be stretched to make the maximum yardage of paper, and if the total estimated tonnage of essential use is to be reached, the groundwood mills should be allowed to operate at full capacity," asserted President Murray in his address before the annual meeting. "Since the entire capacity of groundwood papers is a relatively small part of the total, some are inclined to consider their position as unimportant. But every saving is important in this emergency, and if groundwood papers can spread the available fiber twice as far for an equivalent number of cords, they should be permitted to do so."

He pointed out that the Association is now working with the WPB on a simplification and standardization program for groundwood papers to go farther than the present Order L-120 for book and writing papers, and stated the committee "feels that this job should cover the entire field and has made suggestions accordingly."

Cardboard Manufacturers

The annual meeting of the Cardboard Manufacturers Association was held February 15 in the Waldorf-Astoria Hotel. Malcolm Lowe, of the Lowe Paper Company, Ridgefield, N. J., was elected president, and Kendall Wyman, of the Champion Paper & Fibre Company, Hamilton, Ohio, vice president. G. D. Cook was re-appointed secretary and treasurer. Fred C. Heinritz, of the Appleton Coated Paper Company, Appleton, Wis., was elected chairman of the Coated Tag Group; J. A. Moses, of the Fallulah Paper Company, Fitchburg, Mass., chairman of the Coated Blank Group, and Morris A. Park, of the Marvellum Company, Holyoke, Mass., chairman of the Photo Mount Group.

Paper Napkin Association

Grafton Houston, of the Fort Howard Paper Company, Green Bay, Wis., was re-elected chairman of the Paper Napkin Association at the annual meeting in the Waldorf-Astoria Hotel on February 17. R. G. Fairburn, of Berst-Forster-Disfield, Plattsburg, N. Y., was elected vice chairman. Mark H. Lund, of New York, serves the Association as secretary-treasurer, and was re-appointed.

Association of Pulp Consumers, Inc.

George R. Wallace, of the Fitchburg Paper Company, Fitchburg, Mass., was re-elected to the presidency of the Association of Pulp Consumers, Inc., at the annual meeting in the Waldorf-Astoria on February 17. Norman F. Greenway, of the Robert Gair Company, Inc., New York, was elected vice president, and C. V. Maudlin was continued in office as secretary-treasurer. Five three-year directorates were filled at the election, those elected being R. F. Bellack, Fox River Paper Corporation, Appleton, Wis.; George F. Moxley, West Jersey Paper Manufacturing Company, Camden, N. J.; Austin P. Story, Chillicothe Paper Company, Chillicothe, O.; F. E. Brown, Manchester Board & Paper Company, Richmond, Va.; and L. J. Long, Crystal Tissue Company, Middletown, O.

Specialty Paper and Board Affiliates

A new Executive Committee for the ensuing year was elected at the meeting of the Specialty Paper and Board Affiliates on February 17 in the Waldorf-Astoria Hotel. The newly-named committee will hold its annual meeting in New York in March and elect a president and vice president. The new Executive Committee consists of H. S. Lewis, J. P. Lewis Company; P. R. Bachman, Riegel Paper Corporation; F. C. Ash, Oswego Falls Corporation; Edward Bailey, Hollingsworth & Whitney Company; W. S. Gamble, Brownville Paper Company; H. C. Johnson, Sorg Paper Company; Walter B. Sheehan, Missiquoi Corporation; S. B. Sutphin, Beveridge Paper Company; G. E. O'Connor, Mohawk Paper Mills, Inc.; T. S. Foster, Foster Paper Company; L. E. Vose, Hollingsworth & Vose Company, and Kendall Wyman, Champion Paper & Fibre Company.

Chairmen of the several groups were chosen as follows: Tag and File Folder Group, P. R. Bachman, Riegel Paper Corporation; Bogus Bristol Group, G. D. Sutphin, Beveridge Paper Company; Lined Board Group, T. Stuart Foster, Foster Paper Company, and Mill Blanks Group, A. H. Miller, J. P. Lewis Company.

United States Pulp Producers

The annual meeting of the United States Pulp Producers Association was held in the Waldorf-Astoria Hotel on February 14, at which five regional directors and six directors at large were elected to the Executive Committee for the ensuing year.

The regional directors are Amor Hollingsworth, of the Penobscot Chemical Fibre Company, representing New England; Norman W. Wilson, of the Hammermill Paper Company, Middle Atlantic; Alexander Calder, of the Union Bag & Paper Corporation, South; Stuart B. Copeland, of the Northwest Paper Company, Lake States, and Robert B. Wolf, of the

THIS WAR IS BEING WON *by means of* ~~ON PAPER~~!

"The Government Printing Office is now in production on Ration Book No. 3, the fourth book in a program which will use 15,000,000 pounds of the new 16-pound sulphite safety paper now being produced by 14 mills."

That's some paper!—15,000,000 pounds. Only a straw in the wind, however. Also, about 9,000,000 pounds of chemical wood manila paper for book covers. Previous jobs running up to 400,000,000 copies. Ration Book No. 2—150,000,000 copies.

Scores of other items too. Waterproof containers for export, percussion caps, army manuals, towels, shell containers, wrapping paper, mechanical drawings, war stamps and bonds, camouflage and blackout paper. . . . All of them requiring enormous quantities of paper. Totals approaching astronomical figures. The upshot of it: paper is *an absolute fundamental* in the success of our arms and all that pertains thereto. You who manufacture paper and we who furnish you with Fourdrinier wires have plenty of work to do—*and fast.*

There is no time in this country for doing anything twice because it was done wrong the first time. To turn out any product even one whit less than the very finest of which we are capable is almost criminal. That is true of both the article which is applied directly to a war purpose and the product which makes it—of both paper and Fourdrinier wires. To attain such quality, every man and every woman in every plant manufacturing wire cloth for the paper industry have an unprecedented responsibility to themselves and to the nation. We at Lindsay are endeavoring to give you a product which will show that we are conscious of our obligations.

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Serving the Paper Industry Since 1903

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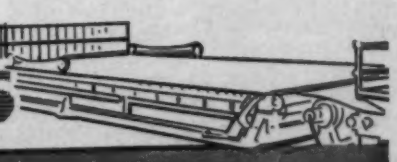

Lindsay **WIRES**

FOR PAPER MILLS

Pulp Division of the Weyerhaeuser Timber Company, West Coast.

Directors at large are Folke Becker, Rhinelander Paper Company; Downing P. Brown, the Brown Company; J. M. Conway, Hoberg Paper Mills; U. M. Dickey, Soundview Pulp Company; M. B. Houston, Rayonier, Inc., and Lawson Turcotte, Puget Sound Pulp & Timber Company.

Oliver M. Porter, of New York City, was again named executive director of the Association.

Blotting Paper Manufacturers

The Blotting Paper Manufacturers Association held its annual meeting in the Waldorf-Astoria Hotel on February 15 and re-elected its officers for the coming year. G. A. Carlton, of the Standard Paper Manufacturing Company, Richmond, Va., was re-elected president for his second yearly term; Joseph Hallowell, of the Wrenn Paper Company, Middletown, O., was re-elected vice president, and Russell L. Winget, of New York City, was again named secretary and treasurer.

Glazed and Fancy Paper

John M. Hazen, of the Hazen Paper Company, was elected president of the Glazed and Fancy Paper Manufacturers Association at the annual meeting of that organization in the Hotel Commodore on February 15. Mr. Hazen succeeds Leo R. McDevitt, of the Blackstone Paper Company, who served two annual terms as head of the Association. James T. Cronk, of the Hampden Glazed Paper and Card Company, Holyoke, Mass., was elected vice president for the manufacturing division, and Charles H. Hoffman, of Hughes & Hoffman, New York, vice president for the merchandising division. William B. Snow, of the Middlesex Products Corporation, Cambridge, Mass., was elected as manufacturing member of the Executive Committee, and Samuel Lachman, of the Lachman-Novasel Company, New York, as merchandising member, both for two-year terms. The hold-over members of the Executive Committee are Arthur R. Walsh, of Walther & Co., Brooklyn, N. Y., as manufacturing member, and Ralph E. Laue, of the Bradner Smith Company, Chicago, as merchandising member.

John Strange, an executive of the WPB, was guest speaker at a luncheon which followed the annual meeting and election. He told of plans to provide protection for war products during transportation by having them wrapped in newly-developed papers.

Soda Pulp Manufacturers

The Soda Pulp Manufacturers Association met on February 16 in the Waldorf-Astoria and re-elected its chairman, Eustis Paine, of the New York & Pennsylvania Company, New York, and the following Executive Committee: Amor Hollingsworth, Penobscot Chemical Fibre Company; Rufus I. Worrell, Mead Sales Company, Inc.; Carl Nieswander, Columbian Paper Company, and W. B. Benzing, Champion Paper & Fibre Company. Mr. Worrell was re-elected secretary-treasurer, and Mr. Hollingsworth was again named vice chairman.

Waterproof Paper Group

Otis Angier, of the Angier Corporation, was elected chairman of the Waterproof Paper Group, American Paper and Pulp Association, at the annual meeting of the organization in the Waldorf-Astoria Hotel on February 15. J. D. Griffin, of the Union Bag & Paper Corporation, was chosen vice chairman. Messrs. Angier and Griffin, together with the following, comprise the Executive Committee for the coming year: A. M. Anderson, Sisalkraft Company; F. E. Donovan, Specialty Converters, Inc.; R. D. Terrien, Central Paper Company, and J. D. Young, Edgewater Paper Company. Alternates are G. E. McCorison, Thilmany Pulp & Paper Company, and W. W. Rowe, Cincinnati Industries, Inc.

Col. Patrick F. Powers, commanding officer of the New York Chemical Warfare Procurement District, addressed the meeting and outlined the part waterproof papers are playing in the war, particularly insofar as the Chemical Warfare Service is concerned. He said the waterproof paper industry is actually a part of the Army, with responsibilities that are great because materials it furnishes mean the actual difference between life and death for some of our soldiers should its products fail. The industry has been conspicuously cooperative, said Col. Powers, for which the Chemical Warfare Service is deeply appreciative.

Linweave Association

The Linweave Association at its annual meeting in the Waldorf-Astoria Hotel on February 13 elected the following officers: President, Victor E. Hecht, Zellerbach Paper Company, San Francisco, Calif.; Vice President, Thomas C. Price, Barton, Duer & Koch Paper Company, Baltimore, Md., and Secretary-Treasurer, Philip Richardson, Storrs & Bement Company, Boston, Mass.

Following the business meeting the members of the Association were entertained at luncheon by P. P. Kellogg & Co. Division, United States Envelope Company, after which merchandising plans for 1943 as developed by the company in co-operation with the Association's merchandising and advertising committee were presented by Linweave Manager, T. H. Chambers. General Manager E. V. Johnson of the United States Envelope Company and E. L. Wight, advertising manager, were other speakers on the program.

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▶▶▶ A recent letter from *Robert L. Eminger* states that he is spending a few hours each day in his office and that so far he is getting along very well. He hopes that it won't be long before he will be making some trips again, and we know that when he does he will be warmly welcomed by all of his friends who have missed seeing him since he has been incapacitated.

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SUPPLY DEALERS ANNUAL DINNER

For the second consecutive year a new all-time high record of attendance was scored at the thirty-fifth annual dinner of the New York Association of Dealers in Paper Mills Supplies, Inc., in the Grand Ballroom of the Hotel Commodore, New York, on the evening of Tuesday, February 16, which event always is one of the social highlights of Paper Convention Week in New York. Close to 400 attended the dinner, and in the large crowd were many paper and board mill officials as guests of the supply dealers.

Following the serving of a sumptuous seven-course repast, an entertaining stage show was put on by an array of talented singers, dancers and instrumentalists from the theatre, radio and night clubs, the festivities keeping up until near midnight.

Walter H. Martens, the Association's perennial Dinner Committee chairman, had charge of arrangements for the affair, assisted by John L. Nielsen, president of the Association, and Arthur Rosenfeld, a former president. A handsome souvenir journal of 100 pages containing the menu, the stage program and advertisements of numerous concerns in the trade was distributed as a memento of the dinner. Alfred J. Moran, genial secretary of the Association, headed the Journal Committee, aided by Miss Shirley Rief, Joseph P. Gaccione, Joseph Carrano, Bert Lorenz and Anthony S. Gaccione.

Lunkenheimer Valves

Vital Helps to Industry's Needs

Bronze "Renewo"
200-300 lb. S.P.

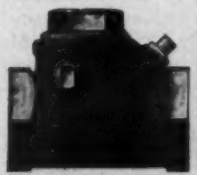
Bronze "N-M-D"
Non-Metallic Disc
150 lb. S.P.

Bronze Gate
Double Wedge Disc
125-150 lb. S.P.

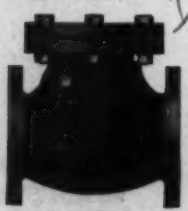
Bronze Gate
Single Wedge Disc
125-300 lb. S.P.

Iron Body Gate
125-250 lb. S.P.

Iron Body
"King-clip" Gate
150 lb. S.P.



Bronze Regrinding
Swing Check
200-300 lb. S.P.



Iron Body
Swing Check
125-250 lb. S.P.

Illustrated are a few of the many types of Lunkenheimer Valves helping to produce vitally needed equipment for the Army, Navy, Maritime Commission and Air Force and other war agencies.

They're part of the complete line of valves made by Lunkenheimer for every industrial process—of bronze, iron, steel and corrosion-resistant alloys—from tiny needle types to massive power-plant valves—for 125 to 2500 lb. S.P.

A further help is Lunkenheimer's nation-wide distribution through leading supply houses. Wherever there's war activity there's a local Lunkenheimer distributor serving it.

ESTABLISHED 1862

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"QUALITY"

CINCINNATI, OHIO, U. S. A.

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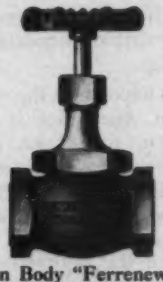
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

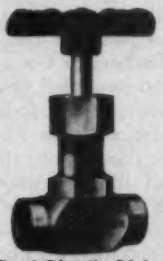
Ask for Catalog 79 and the Guide for selecting Valves, Boiler Mountings and Lubricating Devices.

Bronze Regrinding
200-300 lb. S.P.

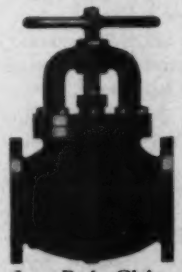


Iron Body "Ferrenewo"
150 lb. S.P.

Bronze Needle Valve
200 lb. S.P.



Steel Needle Valve
3000 lb. W.O.G.



Iron Body Globe
125-250 lb. S.P.

Steel Gate
150-2500 lb. S.P.

Steel Globe
Bonnet-Thread-Bushing
600 lb. S.P.

Steel Check
150-2500 lb. S.P.

BRONZE, IRON, STEEL AND CORROSION RESISTANT ALLOY VALVES, 125 TO 2500 LB. S.P.
BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS

Salesmen's Association *Shows Gain Despite Wartime*

▶▶▶ WITH Courtney H. Reeves, of the Allied Paper Mills, Kalamazoo, Michigan, president of the Association, presiding, the annual meeting of the Salesmen's Association of the Paper Industry was held on the afternoon of February 15 in the Le Perroquet Y Suite of the Waldorf-Astoria Hotel, New York. There was a sizable attendance of the membership.

Reports by the officers revealed that the Association is in a healthy condition, both from a membership and financial standpoint. The Association showed a net gain of five members during the year, despite the loss of many members to the armed services, and the membership now totals 301. An interesting feature of the annual meeting was a report by George K. Gibson, of the Mosinee Paper Mills Company, in behalf of the Western Membership Committee. Mr. Gibson, who was the first president of the Salesmen's Association, pointed out there are now 17 past presidents of the Association, all of whom are alive and in good health, and he offered the suggestion that at the next annual meeting in 1944—which will be the Association's 25th yearly gathering—special honor be paid to these former presidents. "Any paper salesman who wishes for longevity should become president of the Salesmen's Association, and long life will be his award," remarked Mr. Gibson in commenting on the fact that every past president of the Association is now alive.

E. F. Miles reported for the Eastern Membership Committee, Norman T. Beardsley for the Eastern Division, of which he was vice president for the past year, and President Reeves read the report of Burt B. Fisher, Western vice president, who because of train delay had not yet reached New York.

The annual election resulted in the elevation of Norman T. Beardsley, of the Union Bag and Paper Company, New York Eastern vice president, to the presidency of the Association, succeeding Mr. Reeves. Stanley O. Styles, of the Martine Cantine Company, New York, was elected Eastern vice president; E. F. Miles, of the Crocker-McElwain Company, Holyoke, Mass., assistant Eastern vice president; Burt B. Fisher, Bergstrom Paper Company, Chicago, Western vice president, and Forrest Patterson, of the Flambeau Paper Company, Chicago, assistant Western vice president.

Invariably a highlight of the American Paper and Pulp Association convention in New York, the annual luncheon of the Salesmen's Association on February 16 in the Grand Ballroom of the Waldorf-Astoria established a new high record of attendance, more than 1,500 being present. Retiring president Courtney Reeves acted as toastmaster and introduced the speakers as well as other notables in the huge assemblage. Principal speakers were George H. Mead, president of the American Paper and Pulp Association; William W. Chaplain, veteran war correspondent and now a NBC news commentator, and Norman T. Beardsley, the newly-elected president of the Salesmen's Association.

Seated also at the main table on the dais were E. W. Tinker, executive secretary of the American Paper and Pulp Association; Grover Keith, president of the American Pulp and Paper Mill Superintendents' Association; Arthur G. Wakeman, chief of the WPB Pulp and Paper Division; James A. Perkins, chief of the OPA Paper and Paper Products Branch; Ralph A. Hayward, president of the Technical Association of the Pulp and Paper Industry; A. E. Cadman, secretary of the Canadian Pulp and Paper Association; Robert E. Canfield and William W. Corlett, of counsel for the American Paper and Pulp Association; Burt B. Fisher, Western vice president of the Salesmen's Association, and Dr. E. O. Merchant, secretary of the Salesmen's Association.

President Mead emphasized the international scope of the paper industry, and urged the Salesmen's Association membership to do a selling job on the war effort during the year ahead, especially that they sell to the people of America the thought that they refrain from criticism of our Allies, more particularly the English speaking people of the world. "If they do that they will be making a worthwhile contribution to their country and to their industry," he asserted.

Prior to Mr. Chaplain's address, a movie loaned by *Time* and *Life* magazines was shown, representing the work of 160 photographers, 30 of whom lost their lives in making the movie, and constituting a vivid photographic record of action on all Russian war fronts.

Mr. Chaplain spoke interestingly on the latest war developments, bringing his audience up to date on the latest news headlines, and telling of the brilliant work of the Russians, both on offense and defense, in the war against the Axis. He stated that the meritorious results of the Russians could not have been accomplished without the help of other countries, and that they fully recognized the aid that had come to them from America in the form of planes, tanks and jeeps. Previous to November 7 last Americans were not too popular in Russia, he said, but when news came through that American troops had landed in Africa the Russians realized that Americans actually were in the war with them and twelve days later the Russian army went forward with the knowledge they had a strong military force and able Allies. He commented at some length on the shortage of paper of all kinds in Russia, and expressed the hope that in our own rationing we should profit by the mistakes made by our Allies so that these same mistakes will not be duplicated in the United States.

Mr. Beardsley spoke briefly to the assemblage, and after taking over the gavel to adjourn the luncheon meeting presented to Mr. Reeves an engraved token of the Salesmen's Association's gratitude for his service as president of the Association during the past year.

◆

CHAMBER OF COMM. PLANS NATIONAL HEALTH CRUSADE

The Chamber of Commerce of the United States has launched a nationwide health crusade to make more effective the nation's manpower for war and civilian requirements.

A National Health Advisory Council has been created having as members 33 leading authorities on health, hygiene, safety and nutrition.

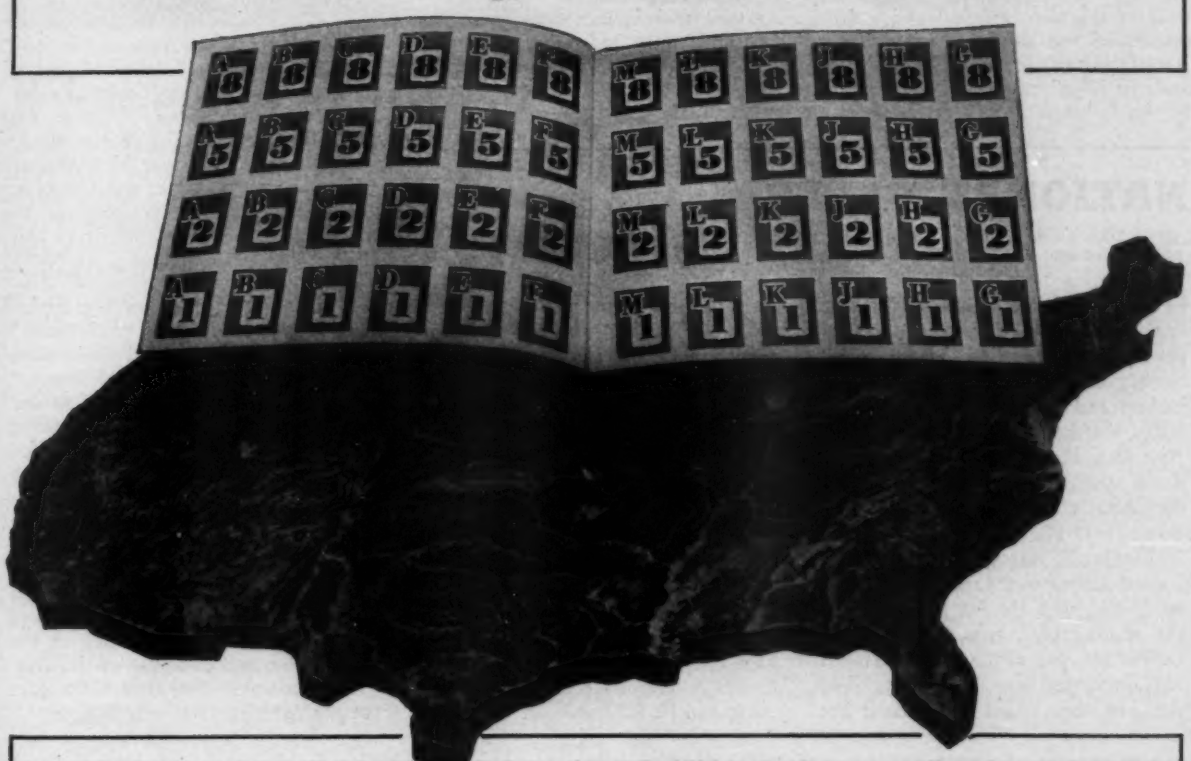
The council will give attention to health problems of both war industries and civilian establishments. The work will supplement the annual health contest conducted by the Chamber among its member organizations. The council will be headed by Dr. James L. McLester, of the University of Alabama.

◆

SUPTS. PLAN FOR WARTIME MEETING IN NEW YORK CITY

The national convention of the American Pulp and Paper Mill Superintendents Association will be held at the Commodore Hotel in New York City on June 15-17, and will feature

Book-of-the-Year



IT IS RATION BOOK NO. 2—the book that will help to insure fair distribution of many of the nation's commodities in 1943. *Paper* made it possible.

Twenty-three paper mills produced the ninety-six carloads of paper required for the making of the 150,000,000 copies. Sixty-nine plants did the printing.

This is the largest printing job in history—the greatest single dramatic example of how the paper industry is serving a nation at war.

KENWOOD WOOL PRODUCTS

F. C. HUYCK & SONS

Kenwood Mills

Albany New York

F. C. Huyck & Sons is proud to be serving an industry so essential to the war program. Our skill, our facilities and our 72 years of experience are always available in solving the special felt problems created by urgent wartime paper needs.

a program designed to aid in the war effort.

Highlights of the convention will include an exhibit of paper, paperboard, and paper products to show how paper is helping to win the War; a discussion of problems facing the pulp and paper industry as a result of the War by outstanding representatives of the war agencies; and a discussion of the important labor problems facing the industry. The "Paper and the War" exhibit will be staged by the Industrial Affiliates Committee which arranged the successful Maintenance and Conservation Forum held at the national convention of the Superintendents Association last year (cf. THE PAPER INDUSTRY AND PAPER WORLD, July, August, September, 1942).

The group meetings will be featured by round table discussions of processing and maintenance problems, and superintendents and other operating men, as well as representatives of the allied industries will be invited to attend and take part in these discussions.

NATIONAL PAPER TRADE ASSOCIATION

▶▶▶ THE FORTIETH ANNUAL CONVENTION of the National Paper Trade Association, whose membership comprises the leading paper jobbers and merchants of the United States, was held concurrently with the American Paper and Pulp Association's annual convention in the Waldorf-Astoria Hotel, New York, on February 15-17, inclusive.

Corwine E. Roach, president of the Capital City Paper Company, Springfield, Ill., was elected president for the ensuing year, succeeding Richard C. Kettles, Jr., of Charles F. Hubbs & Company, New York City. For the past three years Mr. Roach has been vice president of the Association's Wrapping Paper Division. Elected with him were Richard M. Harris, president of the Alling & Cory Company, Rochester, N. Y., as vice president of the Fine Paper Division; George E. Carpenter, of the Carpenter Paper Company, Omaha, Neb., as vice president of the Wrapping Paper Division, and J. O. Bulkley, of Bulkley, Dunton & Company, New York, as treasurer. Arthur H. Chamberlain continues as executive secretary of the Association.

Elected to the Executive Committee were A. W. Towne, of the Blake, Moffitt & Towne Company, San Francisco, and H. L. Cowan, of the Franklin-Cowan Paper Company, Buffalo, New York, for the Fine Paper Division, and S. S. Weil, of Joseph Weil & Sons, Inc., Chicago, and W. W. Hinrichs, of Fred W. Hinrichs, Inc., New York, for the Wrapping Paper Division.

Among those who addressed the meetings of the paper merchants were United States Senator James E. Murray of Montana, chairman of the Senate Small Business Committee and a member of the Senate Committee on Education and Labor; Arthur D. Whiteside, president of Dun & Bradstreet, Inc.; Col. Charles M. Piper, of the Industry Council of the Office of Price Administration, Washington; E. J. Durkin, president of the Paper and Twine Club; Fulton Lewis, Jr., noted radio news commentator; E. W. Tinker, executive secretary of the American Paper and Pulp Association; Lieut. John W. Power of the United States Navy, who expressed the appreciation of the armed services for the critically needed metals furnished through the national key collection conducted by the Paper and Twine Club; Michael Schwarz, deputy director of the Copper Division of the WPB, who also spoke on the excellent results achieved from the key collection campaign; Robert F. Kelley, of the United Service Organizations, and Benjamin A. Javits, counsel to the Association and chairman of the Post-War Economic Planning Committee of the American Business Congress.

L to R—Colonel Charles M. Piper, Industry Counsel, OPA, on his way to speak before the National Paper Trade Association. . . . Newly elected officers of the National Paper Trade Association are: J. O. Bulkley, Bulkley, Dunton & Co., New York City, treasurer; Corwine E. Roach, Capital City Paper Co., Springfield, Ill., president; G. E. Carpenter, Carpenter Paper Co., Omaha, Neb., vice president in charge of Wrapping Papers; and R. M. Harris, Alling & Cory Co., Rochester, N. Y., vice president in charge of Fine Papers.

What every plant operator should know about GLASS PIPING!

What about breakage?

Nearly 20 years of service under all kinds of plant conditions have proved that "PYREX Piping can take it" under actual plant operating conditions. Glass in this form is *not* as strong as metal, but workmen instinctively respect glass and quickly learn to handle it without breakage. With reasonable care in avoiding installation strains or sharp impact, PYREX Piping will give years of trouble-free service. The glass itself is very hard—about twice as resistant to abrasion as ordinary glass. Thus, it is particularly suitable for abrasive, corrosive slurries. PYREX Piping is recommended for working pressures up to 100 lbs. per sq. in. You can install and use this piping with confidence.

IS GLASS PIPING AVAILABLE NOW?

Yes. Glass-making materials are still fairly plentiful.

We do need priority ratings that enable us to get accessories (flanges, gaskets), to assign necessary labor, and to establish the position of your order in our production line. With such priorities we have been making 6 to 8-week deliveries.

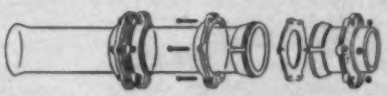
Available sizes and lengths: 1", 1½", 2", 3", and 4" diameters—and any length from 6 inches to 10 feet (longer lengths on special request). There are corresponding ells, tees, return bends, and reducers.

Accessories: Joints are compression type—with conical pipe ends compressed to a self-centering gasket by metal flanges and clamping bolts. We supply gaskets of materials suited to the liquid or gas you want to convey.

WHERE DOES IT GIVE BEST SERVICE?

Wherever hot or corrosive liquids or gases must be conveyed . . . wherever products must be protected from contamination . . . wherever it is important to know what is happening *inside* a line . . . there PYREX Piping gives you its most profitable service.

Chemical plants use it to eliminate their corrosion problems, because it resists all hot or cold acids (except HF). Food and beverage manufacturers like it because it's easy to keep clean, either by simple flushing or with steam or strong hot cleaning solutions. It helps to produce a purer product.



IS IT EASY TO INSTALL?

Plant workmen have found it easy to make installations themselves. In fact, green plant mechanics have recently done first-rate installations with PYREX Piping.

You may install from one piece to a whole system—for PYREX Piping may be joined to existing metal lines and equipment. And it is hung and supported much like other types of piping. (See photo at bottom of page). We do recommend that hangers and supports be padded, to minimize scratching.

WHAT DOES IT COST?

The initial cost of PYREX Piping (accessories included) is about the same or less than the cost of full-weight copper or brass piping, in comparable sizes, and is considerably less than the cost of stainless steel.

And because PYREX Piping does not wear out under acid attack, it gives long trouble-free service, with resultant low long-time cost.

The left-hand photograph at the bottom of the page is an example. That PYREX Piping has carried a slurry of crushed quartz and sulphuric acid for over eight years—without one cent of maintenance.

WATCH FOR CORNING ADVERTISEMENTS!

Watch this magazine for more information in Corning's advertisements headed "What every plant operator should know about Glass Piping." And Write for PYREX Piping Bulletin No. 814. Industrial Division, Corning Glass Works, Corning, N. Y. Branch Offices: New York, 718 Fifth Ave.; Chicago, Merchandise Mart.

PYREX Piping is easy to install and once installed it's there to give service over a period of years.

Glass Piping is used extensively in the plant of Chef Boyardi.

Corrosion by fruit and vegetable acids has no affect on this PYREX Piping carrying food products.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass

PAPER AND PULP REQUIREMENTS

ARTHUR G. WAKEMAN, Director
Pulp and Paper Division, War Production Board

▶▶▶ TODAY I WANT TO GIVE YOU an accounting of the pulp and paper situation insofar as present data permit. These data are not complete; they can't be under the circumstances, because some unexpected shortage, some change in overall policy, can alter facts beyond recognition.

We can, however, give you some picture of events to come, the reasons why they are likely to occur, and the broad outline of our policy of dealing with them.

We believe producers and consumers of paper are entitled to know what faces them. Both production and consumption are widespread, complex problems involving careful scheduling. Sudden changes for which plans have not been made or at least tentatively considered, can result only in waste, inefficiency and delay.

During the past year thinking has changed. It used to be that the war could be carried on and all the necessary civilian needs taken care of if the industry operated at a rate of 10 to 11 million tons a year. We operated, at the peak of about 18½ million tons a year and because we got along during the depression of 1932 on about 8 million tons of paper and board, there was a tendency to assume that we should go back to somewhere near that figure.

Last year we did not realize the demands that would be put on paper and board and its necessity in the kind of war we are now in.

Last February, the Allied Nations still controlled the Philippines, the Malay States and the East Indies. We had not lost our rubber, jute, and sisal. We didn't have to package the food and wrap the equipment for our armies on many fronts as we are doing today.

Things have changed and now that the requirement figures for paper and board are all in, it is a matter of how are we going to meet them with the raw material we have available.

The one question I am asked so often is: "How much paper and board do we need?" As a result of studies made by the Pulp and Paper Division I am able to give you our best estimates of the answer for the second quarter.

A word about how such studies are made. Within WPB there is provision for sub-requirements committees to collect and analyze all requirements for the products handled by the Division The Pulp and Paper Division has such a sub-requirements committee and on it are representatives of each claimant agency interested in production of pulp and paper. The Division Director is its chairman and is responsible for forming the committee.

Each of the claimant agencies submits its requirements and the Division acts as a consultant to aid the claimant in getting the most accurate data. The Division, as such, has no jurisdiction over this committee. However, every attempt is made to arrive at estimates that are acceptable to all parties—the staff of the Division and the representatives of the claimant agencies. The Director of the Division is responsible for bringing the program into as close a balance as possible. If there is need for further revision, the data are submitted to the Program Adjustment Committee. Final action on the program is taken by the Program Vice-Chairman, Mr. Eberstadt.

Let me tell you who the major claimants for pulp and paper are.

First is the Army. Its representative presents requirements for all its direct military needs.

Second is the Navy. Its representative presents its own requirements as well as those of the Coast Guard, Marine Corps and the Maritime Commission.

The Administration of Lend-Lease has a representative who watches the requirements for the United Kingdom and some other countries, with the help of the State Department.

The Board of Economic Warfare's representative takes care of that agency's requirements and in addition, the requirements of the countries under Mr. Nelson Rockefeller's jurisdiction.

The major claimant for paper and board is the Division of Civilian Supply. This is a part of the War Production Board under Mr. Nelson. It is by far the largest claimant, its requirements representing about 30 per cent of the total tonnage. The Division of Civilian Supply has to take care not only of civilian needs, but also of the indirect war needs of the Government agencies, with the exception of the military.

The total requirements of these claimant agencies today is more than 15,000,000 tons of both paper and board for the year. I will break this down by the major products of the industry.

The first is newsprint. This is an international problem. We only make about 20 per cent of the newsprint on our side of the border, Canada being the major supplier. This industry is now operating at 10 per cent below the peak base period that has been chosen for all these calculations. This base period is the six months ending March 31, 1942.

After careful checks on this side of the border, as well as in Canada, the figures on wood supply, including wood on hand and the quantity now being produced, show that the amount available for production will just about balance with the consumption if the industry operates at 80 per cent of its peak. Newsprint consumption therefore, must be cut further, probably 10 per cent, about the end of the first quarter of this year.

Printing papers, covering the whole field from super book to envelope, tablet, and post card and including groundwood paper, are now operating at 80 per cent of the peak period. The Requirements Committee's figures, as reported to us, are well below the present production rate. This means further curtailment in use to absorb the difference between production and consumption. We hope to be able to do this on a gradual basis, reviewing the problem of supply available regularly. Another cut in consumption in the neighborhood of 10 per cent at the end of the first quarter is indicated.

The requirements for fine papers are higher, percentage-wise, than the printing papers in general. Bleached pulp being one of the items of which we are short, it is inevitable that a cut in the future will be necessary. The balancing of these grades will have to be done from now on by types of paper. Some grades will be held at present production, others will move down, all according to relative essentiality. The overall result will be a cut of about another 10 per cent at the end of the first quarter.

Last March we had 124,000 tons of bleached pulp to allocate; last month we had only 88,000 tons to distribute to the paper industry. This will indicate to you what the trend in this type of paper will be—27 per cent less pulp, to be exact. However, we produced last month at a higher level; but we couldn't use it for paper, much of the balance has been reserved for explosives.

Wrapping and specialty papers represent a large tonnage—about a sixth of the industry's production. This industry is operating at 15 per cent below the peak now and the essential requirements as presently estimated are just about at this overall level. But there undoubtedly will be changes in certain types of paper, depending on developments. For example, the military needs, both direct and indirect, for strong fibre papers.

Sanitary papers and other tissue will be left just about where they are at present. The public health of the nation and the medical requirements of the Surgeon General's Department dictate this. There may have to be some down grading, however, as the supply of pulp diminishes.

Container board comes next. This is about a quarter of the total amount of tonnage in the entire field of paper and paperboard. The demands on certain types of board for ammunition containers, overseas shipping boxes, substitutes and a host of special and war products are increasing daily. The major problem faced by the industry is to meet these needs—and they can't be met without cutting into civilian uses. The problem of supplying this container board is no more and no less important than supplying the essential quantities of other types of paper and board.

Our problem is to so utilize the short supply of raw material as to produce no more and no less than the essential quantities of each paper and paperboard product, and to see that it gets to the proper use.

Folding and set-up boxes are operating at 80 per cent today. Apparent requirements indicate that the needs will be somewhat higher. As these develop, adjustments of certain types will be necessary. Specialty boards cover such a wide range of products that it is impossible to generalize. Some needs will be much higher,

others will gradually fall off, and as these changes take place, many individual adjustments must be made—for example, as replacements for leather become increasingly urgent. Current operations appear to be in balance.

The last on this list is building papers and building boards. For military reasons, these papers are to be left on the unrestricted list for the time being. The first call on this industry's product lies with the armed forces.

How are we going to make more than 15,000,000 tons of paper and board with the amount of pulp we know we have available? From the estimates today, we are going to have about 8½ million tons of wood pulp available for paper and board production in this country. This will mean forcing the use of waste paper and other waste fibres up to the limit, and further down grading. This is emphasized by the relative fact that last year we used 10,500,000 tons of wood pulp to make 16,584,520 tons of paper and board.

This year we will have to get along on about 8½ million tons of pulp, and the rest will have to come from waste paper and other waste fibre.

This is a challenge to the industry and a magnificent opportunity for it to give tangible proof of its ingenuity.

These are the facts. We have been given the job of doing everything we can to maintain production at the indicated levels first, and then, when necessary, taking the steps needed to balance with a smaller quantity of fibrous material.

No one realizes better than we that the primary job of gearing production to essential uses and of cutting out the non-essentials must lie with you, the industry. No sane person wants to direct all sales or uses of paper from Washington. Moreover, we know that consumption and production must be kept in balance if you are going to do your job and if we are to escape the impossible job of allocating according to use.

That is where we come in. We can give you signs on which way to go. We can eliminate non-essential uses, and we can give you essential classifications, when necessary.

This does not all lie in the province of the Pulp and Paper Division. With respect to end-use control, the Printing and Publishing and Containers Divisions have large responsibilities, controlling in the aggregate about 75 per cent of the total production of the industry.

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Papermaking Machine

Patent No. 2,289,430. Irving C. Jennings, South Norwalk, Conn. Application May 8, 1936, Serial No. 78,704. 11 Claims. (Cl. 92—53). A suction box for the suction roll of a paper making machine comprising a chamber effective to maintain a predetermined vacuum on the roll, and means to seal said chamber against leakage comprising a second chamber surrounding said first chamber and effective to maintain and place a sealing vacuum for said first chamber on the roll independently of said first chamber, and means for independently creating a vacuum within each of said chambers.

Cloth-making was at first one of the household industries of New England. Our grandparents raised their own sheep, our grandmothers carded, twisted and spun the wool to be woven into sturdy homespun cloth.

Towards the end of the 18th century machinery began to take the place of hand-work, but you may still see heirloom spinning wheels in many of our best New England homes—ornamental reminders of an art perpetuated mechanically by the third generation of the DRAPER family.

DRAPER FELTS are modernly made, but with the same old-fashioned zeal for perfection. You'll be satisfied with DRAPER FELTS!

Draper Felts Favor Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASS.

OUR REPRESENTATIVES to serve you

L. H. BREYFOGLE, Kalamazoo, Mich.
W. L. CAMPBELL, Savannah, Ga.
RALPH E. BRIGGS, Canton, Mass.
C. K. BEECHER, Delaware, Ohio
E. R. LELOFF, Vancouver, Wash.

ALLIED

S. F. Bowser & Company, Inc., Fort Wayne, Indiana—This organization has just been awarded the six-month production star. The Army-Navy "E" was presented last July (cf. THE PAPER INDUSTRY AND PAPER WORLD, August, 1942, p. 508), and this latest award denotes the continuance of high production standards during the intervening six months.

Buffalo Pumps, Inc., Buffalo, New York—Maintenance of excellence in production has resulted in the addition of a white star in the Army-Navy "E" flag of this company. The original award was received six months ago (cf. THE PAPER INDUSTRY AND PAPER WORLD, October, 1942, p. 730), and the star denotes renewal of the award.

International Nickel Company, Inc., Huntington, West Virginia—The fourth production award—the right to fly the Army-Navy "E" with three stars—has recently been conferred upon the Huntington Works of this company. Previously the plant had received the Naval Ordnance award, followed by renewal in the form of the All-Navy "E" award with one star, and the Army-Navy "E" with two stars (cf. THE PAPER INDUSTRY AND PAPER WORLD, November, 1942, p. 835). Huntington Works was among the first fourteen in the entire United States to receive the original honor and the first in the entire Fifth Naval District to receive all of the first three.

Masonite Corporation, Laurel, Mississippi—The Army-Navy "E" award was presented to the men and women of this company at ceremonies held February 24. In order that the ceremonies could be brought to all who had helped in the winning of the award, Masonite Corporation arranged for a nation-wide broadcast of the ceremonies.

Mathieson Alkali Works, Inc., New York City—The Niagara Falls plant of this company has been presented the Army-Navy "E" for high achievement in production. The flag was presented on February 26 by Colonel Harry A. Kuhn, of the office of the chief, Chemical Warfare Service, Washington, D. C., and was accepted by G. W. Dolan, executive vice president of the organization. Colonel Kuhn was introduced by Lieutenant Colonel Charles F. Mosher, officer-in-charge of the Buffalo Sub-Office, Rochester Ordnance District, representing Colonel F. J. Atwood of the District. Master of ceremonies was Rob Roy Macleod, executive vice president of the Niagara Falls Power Company. "E" pins were presented by Lieutenant Commander George W. Eighmy, U.S.N.R., of Buffalo, to a committee representing the plant employees.

Ohio Injector Company, Wadsworth, Ohio—The Army-Navy "E" pennant awarded this company August 26, 1942 (cf. THE PAPER INDUSTRY AND PAPER WORLD, September, 1942, p. 608), has been renewed. This recognition of continued outstanding performance in production adds a white star to the Army-Navy "E" pennant. In announcing the new honor, Admiral C. C. Bloch, U.S.N. (retired), in a letter to Wayne Young, president of Ohio Injector, congratulated each employee on their continued splendid achievement.

Simonds Saw and Steel Company, Fitchburg, Massachusetts—The saw, knife and file plant, and the armor plate plant, of this company, have been awarded the Army-Navy "E" flag. Presentation ceremonies took place February 9, attended by nearly 2000 employees of the two factories and their guests. Brigadier General Burton O. Lewis, U.S.A., Boston Ordnance District, presented the flag, which was accepted by Gifford K. Simonds, Jr., general manager of the company. Captain Gordon C. Hall, U.S.N.R., presented the "E" insignia pins. Theodore T. Carlson, president of the Simonds Employees Aid and Benefit Association, accepted the pins on behalf of the employees.

Worthington Pump and Machinery Corporation, Harrison, New Jersey—At noon-time ceremonies on January 22, Admiral Harry L. Brinser, U.S.N. (retired), presented the Navy "E" star burgee to the Harrison plant of this company. The star burgee was a renewal of the Navy "E" awarded on June 26, 1942. Hobart C. Ramsey, Worthington's vice president in charge of operations, received the award. Highlights of the program were the talks by a Navy Gunner's Mate and a Marine corporal, heroes of recent action in the Mediterranean and the Solomons. Lieutenant J. Douglas Gessford, U.S.N.R., served as master of ceremonies. John P. Maguire, regional director of the War Production Board, also appeared on the program.

▶▶▶ THE NEW YORK OFFICE of Mixing Equipment Company, Inc., has been shifted from 377 Broadway to 136 Liberty Street. Glenn J. Moorhead, formerly Pittsburgh representative for the company, has assumed the position of Eastern divisional sales manager, with headquarters at the new location. C. F. Donovan will continue his duties as manager at the new address.

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▶▶▶ ACCORDING TO THE OFFICE of the Secretary of Commerce, Defense Plant Corporation has authorized a contract with H. K. Porter Company, Inc., of Pittsburgh, Pennsylvania, to provide equipment for a plant in Pennsylvania at an approximate cost of $100,000. The facilities will be operated by H. K. Porter Company, Inc., with title remaining with Defense Plant Corporation.

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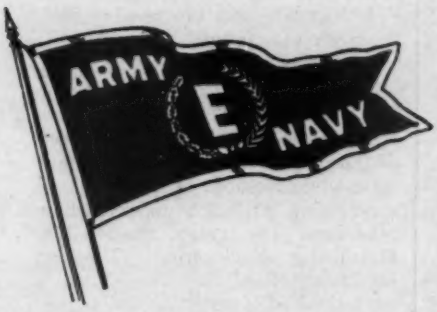
▶▶▶ WHITING CORPORATION, Harvey, Illinois, has announced that the headquarters of its Canadian subsidiary, Whiting Corporation (Canada) Ltd., have been moved to 45 Richmond Street, West, Toronto. H. M. Rowlette, newly elected vice president and general manager, will be in active charge of the Canadian business. He succeeds Col. James Mess, who is now devoting full time to government duties at Ottawa.

◆

R. P. HILL JOINS WEBSTER-BRINKLEY

Raymond P. Hill, president of the Pulp Bleaching Company, Wausau, Wisconsin, has been named technical assistant to George Gunn, Jr., president of the Webster-Brinkley Company, Seattle, Washington. Mr. Hill joined the Pulp Bleaching Company in 1924 as vice president and has served as president since 1930.

Mr. Gunn, Mr. Hill, and Thomas J. Bannan, vice president of Webster-Brinkley, have formed an association looking toward the development and manufacture of a line of process equipment after the War with particular reference to the pulp and paper industry. All three men are engineers and



This distinguished "E" flag, awarded to us by the Army and Navy for excellence in war production, is a proud and significant symbol of appreciation that our fighting forces and the men and women of American industry are partners in the great struggle for human freedom. We are part of a *free industry* of a *free country* and we're working to keep it that way.

We are proud of our part in the production of war equipment. Everything we are doing at home seems so small in contrast to what our men and women are doing on the fighting fronts. Let's remind ourselves, nevertheless, that our jobs are war jobs and that *everything counts.*

We will continue to increase our production of war materials and help others increase theirs.

We will continue to back up our sons, our comrades and our fellow-Americans now serving with the colors. It is a privilege for us to put everything we have in resources, experience and skill into our effort to help them.

Victory, absolute and final, is our only objective.

Now is no time to relax. Now is the time for all of us . . . for you who read these sentiments and for us who experience them . . . to do all in our power to get this war over sooner.

It's up to *you* . . . and *us.*

CHROMIUM CORPORATION OF AMERICA

NEW YORK · WATERBURY · CLEVELAND · CHICAGO

What do you mean...

SELF-LUBRICATING PACKING ?

Palmetto and other Greene Tweed packings contain an extra reservoir of lubricant... not oil-can oil... but a special graphited lubricant which is hot-impregnated into every strand BEFORE braiding. This extra lubricant replaces that lost through wear and keeps Greene Tweed packings soft ... in service longer ... without danger of scored shafts.

Try a Greene Tweed Packing (see list below) ... and you will quickly learn its many benefits. Obtainable from your supply house or, if necessary, from us.

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TWISTED

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for steam, hot water, air. PALCO for water. PELRO for oils. CUTNO for alkalis. SUPERCUTNO (blue asbestos) for acids. KLERO for foods.

SELF-LUBRICATING

PACKINGS

all are familiar with the pulp and paper industry.

As a part of this program, the assets and business of the Pulp Bleaching Company will be taken over by the association, and the headquarters of Pulp Bleaching will be moved to Seattle in the near future.

◆

▶▶▶ WAR BONDS worth $650 have been awarded in a nationwide contest designed to reveal to industry the most outstanding methods of salvaging and maintaining machinery under wartime conditions. The contest, sponsored by Metallizing Engineering Company, Inc., Long Island City, New York, is the second of a series of similar contests open to users of any metal spraying equipment in the United States and Canada.

◆

DEPT. OF LABOR FINDS FEWER WAR PLANT ACCIDENTS

Through the United States Department of Labor accident prevention program, over a million man-days were saved for war production last year, Secretary of Labor Perkins told regional representatives of the National Committee for the Conservation of Manpower in War Industries recently.

She reported that about 66 per cent of the 10,755 war plants serviced by this Labor Department committee reduced accident frequency rates greatly. She cited, as an example, a California plant that increased its working force 2,500 per cent and reduced accidents from 35 per million manhours worked to 10, thus saving over 8,000 mandays.

◆

ROLLER-SMITH GIVES FIVE-YR. SERVICE AWARDS

Employees of Roller-Smith Company, Bethlehem, Pennsylvania, who have 5 or more years of continuous service were awarded service emblems recently. The awards were made at a party attended by practically all of the 850 employees of the company.

Seven designs distinguished the comparative newcomers who joined the company 5 years ago from their predecessors, with one star being added for each 5 years of service. Among the group were 7 persons who were with either the Whitney Electrical Instrument Company or the Switchboard Equipment Company, which were merged in 1908 to form Roller-Smith. In all, 141 employees have been continuously employed 5 years or longer, and of these, 61 have had uninterrupted service for at least 15 years.

The Paper Industry Safety Scores

July 1, 1942 to June 30, 1943

13 mills have perfect record out of 197 reporting for January

PERFECT SCORES
Division I—Pulp and Paper Mills

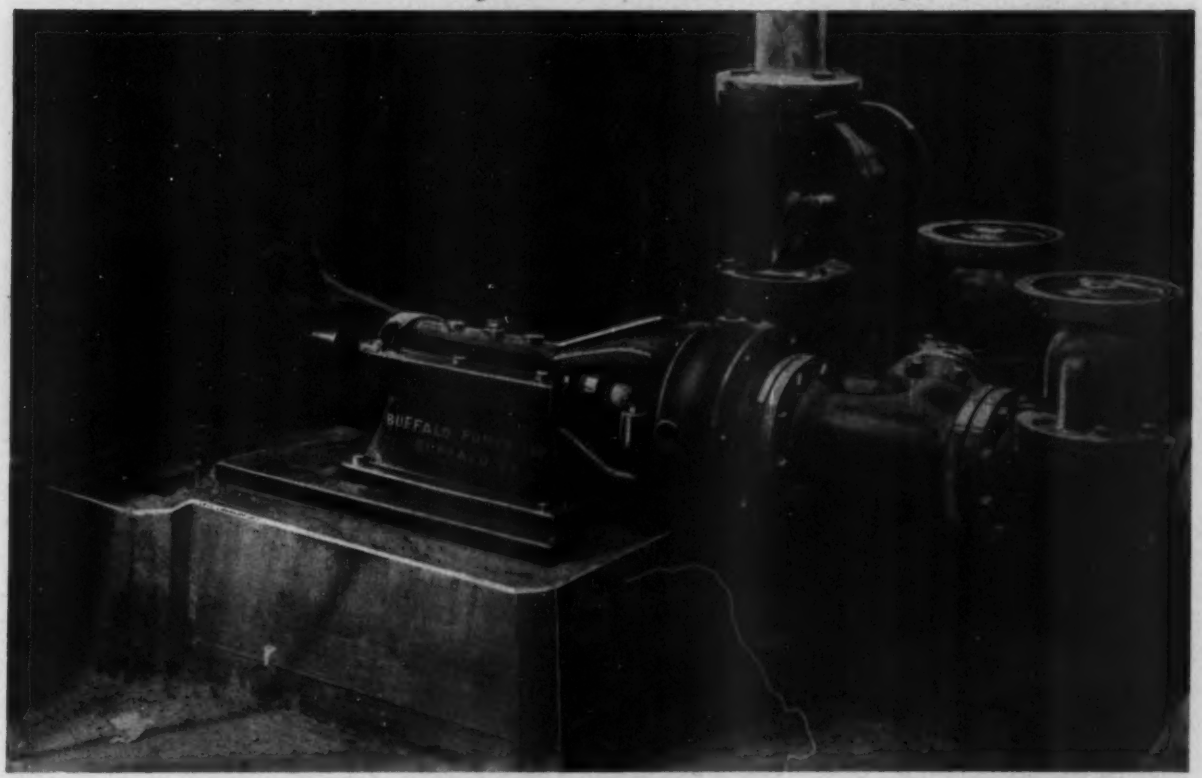
PARTICIPANT	MILL	LOCATION
GROUP A		
GROUP B		
GROUP C		
Price Brothers & Co., Ltd.	Jonquiere	Quebec, Canada
American Writing Paper Corp.	Riverside #2	Holyoke, Mass.
GROUP D		
Marathon Paper Mills Co.	Ashland	Wisconsin
American Writing Paper Corp.	Crocker Div.	Holyoke, Mass.
Spaulding Fibre Co., Inc.	Milton	New Hampshire
American Writing Paper Corp.	Mt. Tom Div.	Holyoke, Mass.
International Paper Co.	Riley #22	Riley, Ma.
Alton Box Board Co.	Carlyle	Illinois

Division II—Paper and Board Re-Manufacturing

Marathon Paper Mills Co.	Wausau	Wisconsin
*Fort Orange Paper Co.	Paper Box Plant	Castleton on Hudson, N. Y.
Thilmany Pulp & Paper Co.	Bag Mill	Kaukauna, Wis.
South West Box Co.	Sand Springs	Oklahoma
Bay West Paper Co.	Green Bay	Wisconsin

*January report missing—covers six months only.

Duration— DURABILITY *..to meet production peaks!*



• Paper, in many ways is a vital implement of war. And Buffalo Paper Stock Pumps are handling all types of paper stock—keeping it flowing—keeping production moving at peak capacity. Look to the Buffalo *design* for the answer to Buffalo's reliable performance—special impellers that can't clog or be crippled by sudden stock consistency changes, smooth running bearings for minimum wear and power consumption. All in all, Buffalo Pumps are meeting the urgencies of war with flying colors!

ARMY E NAVY

BUFFALO PUMPS, INC.

213 Mortimer St. Buffalo, N. Y.

BRANCH ENGINEERING OFFICES IN PRINCIPAL CITIES

In Canada—Canada Pumps Ltd., Kitchener, Ont.

"Buffalo" **PAPER STOCK PUMPS**

NAMES *in the* NEWS

Personals

E. W. MENKE RESIGNS FROM ST. REGIS CO.

Edward W. Menke, general manager of the Oswego (New York) plant of the St. Regis Paper Company, resigned his position effective January 31. St. Regis has not yet appointed a successor.

A dinner given by 56 members of the plant office and engineering force and heads of departments, was held in his honor on January 31.

Mr. Menke has had about 30 years' experience in the engineering and manufacturing business, as he entered this field as a young man upon his graduation from Armour Institute of Technology in 1914.

On three different occasions he has been an executive with the Bates Valve Bag Company, which was taken over by St. Regis in 1929. When St. Regis acquired the concern, Mr. Menke started his own business. He was a consulting engineer with offices in Chicago, and later organized the Kelly-Menke Company. In October, 1940, Mr. Menke accepted the position of the Oswego plant, and has served in that capacity until this time.

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▶▶▶ Philadelphia Quartz Company, Philadelphia, Pennsylvania, has recently announced the appointment of *Robert L. Kreyling* as manager of adhesives sales service. Mr. Kreyling joined the company in 1930 as a sales representative. Since 1933 he has specialized in adapting sodium silicate to the particular needs of the fiber container industry.

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▶▶▶ *Stuart D. Copeland* of the Northwest Paper Company, Cloquet, Minnesota, has been appointed a member of the book, writing, and ground wood industry advisory committee of the War Production Board.

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▶▶▶ For the first time in almost three years, *Lieutenant David Killam,* son of Lawrence Killam, president of British Columbia Pulp and Paper Company, Vancouver, British Columbia, returned home on leave recently. Lieutenant Killam has been awarded the Distinguished Service Cross. While on leave, he was married to Miss Elizabeth Hebb. This is the third union between three sons of Lawrence Killam and three daughters of the late Professor T. C. Hebb. All three sons have been connected with the pulp and paper industry.

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▶▶▶ Leaving his duties as recreation director for the National Container Corporation, Jacksonville, Florida, *Marvin Lewis* has reported to the national headquarters of the American Red Cross in Washington, D. C., where he will become a club program director. It was reported that he will be assigned to a foreign post where his abilities as a recreation and physical education instructor will be of service to the men in the fighting forces.

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CAPT. PICKERING LEAVES FARREL-B. FOR NAVAL SERVICE

Captain Nelson W. Pickering, USNR, resigned as president of Farrel-Birmingham Company, Inc., of Ansonia, Connecticut, and Buffalo, New York, and reported, on February 1,

Capt. N. W. Pickering

for active duty in the United States Navy. He has been assigned to duty as commander of U. S. Navy Section Base at New London and commander of local defense forces in that area.

Graduated from the United States Naval Academy in 1908, Captain Pickering served in the Navy for 15 years before he became connected with Farrel-Birmingham in 1919, when he started work in the roll department of Farrel Foundry & Machine Company, becoming, successively, assistant manager and manager of that department. In February, 1930, he was elected president of Farrel-Birmingham Company, Inc., with executive direction of the company's three plants at Ansonia, Derby (Connecticut) and Buffalo.

Even during his business career Captain Pickering maintained his interest in the naval service. Besides retaining his commission in the Naval Reserve, he commanded the Naval Reserve Force and Naval Militia in the State of Connecticut from 1924 until 1940, when the battalion was called into active service.

Before he left, Captain Pickering was presented with a handsome silver tray by his civic and business associates at a dinner in his honor held at the Hotel Clark in Derby on January 25.

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▶▶▶ The appointment of *Chester F. Conner,* manager distributor sales, industrial products division, The B. F. Goodrich Company, Akron, Ohio, to the staff of advisers on mechanical rubber goods in the office of rubber director, War Production Board, in Washington, D. C.

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▶▶▶ *Rufus D. W. Ewing* was recently elected to the board of directors of the Perfect Safety Paper Company of Holyoke, Massachusetts, at the annual meeting of the stockholders. Other directors, all of whom were re-elected, are J. B. Weis, Norris Sutherland, Jr., and Mildred R. Vallee. Mr. Ewing is president of the Holyoke Card and Paper Company of Springfield, Massachusetts.

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RESEARCH DIRECTOR FOR PITTS. PLATE G.

Dr. Alphonse Pechukas has been appointed research director of the Columbia Chemical Division of the Pittsburgh Plate Glass Company, Pittsburgh, Pennsylvania. He has been serving as acting director since May, 1942. Dr. Franklin Strain has been named assistant research director of the division.

Dr. Pechukas is only 28 years old, and has the distinction of being among the youngest directors of research in

★

The Army-Navy Production Award "E" flag flies at Hammermill, earned by "high achievement in the production of war equipment"—specifically for the production and delivery of paper. Every man and woman at Hammermill proudly wears the "E" pin as an emblem of earnest contribution to our nation's war effort.

★

PAPER *IS* WAR MATERIAL

At an Eastern port, a Navy submarine is getting ready to sail under secret orders. Onto the dock, after a special 30-mile run, dashes a paper merchant's delivery truck with a ton of cut-size bond paper to be loaded aboard.

On a new western Pacific airfield, hundreds of thousands of index cards are unloaded with the first shipment of planes and repair parts—to record the flow of the spare parts into battle service.

From the crow's nest of a cruiser, the lookout sees another war vessel on the horizon and refers to his book of ship silhouettes, a book printed on special waterproofed paper.

Battle orders, diplomatic mail, selective service questionnaires—in thousands of critical ways daily, paper proves itself essential material of war.

Besides the making of paper, Hammermill is engaged in prime contracts and subcontracts for war materials of wood and metal. But it is for the production and delivery of *paper* that Hammermill was honored with the Army-Navy Production Award, the "E" flag.

Modern business methods and modern war methods are alike in their dependence on paper and "paper work." Today, paper *is* essential war material.

HAMMERMILL PAPER COMPANY • ERIE, PENNSYLVANIA

the industrial field. He was born and educated in Chicago; received the S. B. degree from the University of Chicago in 1934 and Ph.D. in 1937. Dr. Pechukas first entered the company's chemical division in 1937 as a laboratory research worker. He is a member of the American Chemical Society and the American Association for the Advancement of Science.

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▶▶▶ General manager of the Fraser Companies, Edmunston, New Brunswick, *E. W. Ross* has been elected president of the Canadian Lumbermen's Association for 1943.

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▶▶▶ Plant engineer for Canadian International Paper Company, Three Rivers, Quebec, *Cecil Hugh Champion* has been appointed engineer to Canadian Newsprint Administrator R. I. Weldon.

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▶▶▶ In the research division of The B. F. Goodrich Company, Akron, Ohio, since 1926, *John M. Davies* has been named director of physical research. He was an instructor in physics at the University of Akron before joining Goodrich as a physicist, becoming a group head in the physical research department in 1939.

GRUENDLER CRAFTSMANSHIP
Employed by U.S.A. in the WAR EFFORT
For a Better Refined Pulp
GRUENDLER "TURBO" REFINER
Saves on power up to 50%
Actually Separates, Hydrates, and Combs Fibres—No disintegration and shortening of Fibres with this new method
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Necrology

CARL JENTZ

Carl Jentz, prominent in the paper manufacturing industry in Canada, Newfoundland, and the United States for more than 53 years, passed away in Asheville, North Carolina, February 13.

Mr. Jentz was a member of the American Pulp and Paper Mills Superintendents Association, and last November was made a lifetime member of the organization. He was the first member of the Southeastern Division to receive this honor.

Mr. Jentz came to the United States from Germany in 1890. He became associated with the Champion Paper and Fibre Company, in Canton, North Carolina, in 1907, when the company began operations and he was its first sulphite department superintendent. Three years later, he left to become superintendent of various mills in Canada and the Northwest. He returned to Canton in 1929, and at the time of his passing was with the statistical department of the company.

Mr. Jents was 73 years old. A son, Carl D., department superintendent of the St. Lawrence Paper Mills Company, Ltd., Three Rivers, Quebec, and a daughter, Miss Thea Jentz, member of the main office staff of the Champion Paper and Fibre Company, survive.

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▶▶▶ General manager, secretary, and assistant treasurer of the Gould Paper Company at Lyons Falls, New York, *George M. B. Williams* passed away February 11. He was born in Port Leyden, New York, and at 17 years of age entered the service of the Gould Paper Company at Port Leyden. Two years later he went to the firm's plant at Lyons Falls. Mr. Williams was 63 years old. His widow and three sons survive.

◆

GUY SMITH WOOD

Guy Smith Wood, 54, connected with the International Paper Company, New York City, in various capacities for over 23 years, passed away January 29.

Mr. Wood was a licensed engineer in the State of New York and was an associate member of the American Society of Civil Engineers. He entered the employ of International Paper Company in 1919, as a member of the engineering department. For several years he was a field engineer in charge of construction work at Palmer and Glens Falls, New York; Berlin, New Hampshire; Three Rivers, Province of Quebec, Canada; and then entered the New York office as a designing engineer. Later he was made sales engineer for a subsidiary company—Montague Machine Company at Turners Falls, Massachusetts.

Mr. Wood was appointed manager of the Herkimer mill in November, 1935, and held this position until the mill was shut down in 1942. After a short time, he was transferred to the Hudson River mill at Palmer, New York, to work in the engineering department.

His widow and a daughter survive.

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MASON HULETT

Mason Hulett, of the Farrel-Birmingham Company, Inc., of Ansonia, Connecticut, and Buffalo, New York, passed away February 7, in Washington, D. C. He was on leave of absence from the company and was serving as chief of the Industrial Gear and Speed Reducer Unit, Material Handling Equipment Branch, War Production Board.

Mr. Hulett was a graduate of Rensselaer Polytechnic Institute, with a degree of civil engineer. He had been connected with the New York office of Farrel-Birmingham for the past nine years as sales engineer and consultant on gears. Prior to that, he had been connected with the Falk Corporation, as New York representative.

Mr. Hulett was 52 years old. He is survived by a son.

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▶▶▶ Well known in the lumber industry, *L. J. Arnold*, treasurer of Crossett Paper Mills Division of Crossett Lumber Company, Crossett, Arkansas, passed away February 28. He was 54 years old. His mother and two sisters survive.

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C. K. BOYER

C. K. Boyer, 56, manager of the Interlake mill of the Consolidated Water Power and Paper Company since 1924, passed away February 11.

Mr. Boyer, who was born in Pennsylvania, was a former president of the Appleton Chamber of Commerce and served on the board of education. He attended Bucknell University and took post graduate work at the Chicago Theological Seminary.

After World War I, in which he served as a captain, he joined the Consolidated Water Power and Paper Company at Wisconsin Rapids as a safety engineer, and was appointed to head the Interlake mill five years later.

WHEN PAPER MAKING WAS AN INDIVIDUAL EFFORT

In 1772 it was a workshop—not a factory—in which paper was made. It was the art of paper making. Now it is an industry—a long way removed from the individual effort of making sheet by sheet. Today machines produce tons easier than the early paper maker produced sheets. Even with individual effort felts were used to remove water from the sheets, and as machines replaced hand methods, felts too kept pace with development of the industry.

Since 1890 Appleton Felts have met all requirements of paper mill production—today preferred by mills everywhere.

make APPLETON FELTS good paper

This advertisement is a continuation of a series started in 1940 depicting early history of paper making.

Appleton Woolen Mills

APPLETON • WISCONSIN

Convention Papers . . . Abridged

The Influence of Cooking and Bleaching Upon the Chain Length Distribution of the Carbohydrate Fraction in Pulpwood

JOSEPH E. ATCHISON[1]

It has been known for a long time that the solution viscosity or the average D.P. (degree of polymerization) of a cellulosic material governs to an essential extent the solution viscosity and various other properties of cellulose derivatives made from such material. Only in recent years, however, have investigators paid attention to the extent to which the proportion of chains of different lengths present in cellulosic materials—i.e., their chain length frequency distribution—may influence their properties and those of their derivatives.

The close relation which exists between the average D.P. of the original cellulose and that of the derivatives prepared therefrom would lead us to believe that the properties of a cellulose derivative (or a product obtained from the derivative by regeneration of the cellulose component) would, to a great extent, depend also upon the chain length distribution as it existed in the original cellulose. Indeed, Schieber and coworkers (Schieber, W., *Papier-Fabr.* 37:245-250, 1939; *Agnew. Chem.* 52: 487-489, 561-568. 1939) has shown this to be true of rayon pulps having varying chain length distribution and of a corresponding number of viscose staple fibers prepared therefrom.

Because it was thought that attempts to prepare an ideal pulp could be guided by a knowlege of the extent to which the chain length distribution of the cellulose, as it exists in the wood, is changed by the conditions of the various types of digestion and, further, by the bleaching of the resulting pulps, a study was undertaken along these lines.

An investigation of the chain length distribution of the cellulose portion in plant material (such as wood) is complicated by the presence of noncellulosic carbohydrates (xylan, mannan, galactan, etc.), because it is difficult to isolate cellulose which is free of these substances without more or less degrading it. It was believed that this complication could best be overcome by extending the investigation to the total carbohydrate fraction (i.e., cellulose plus all noncellulosic carbohydrates) of the wood and considering this fraction as a unity.

The various steps carried out in the present investigation may be listed as follows:

1) The preparation of the total carbohydrate fraction (holocellulose) from sprucewood.

2) The preparation of sulphite, sulphate, and soda pulps from the same lot of wood.

3) The bleaching of the three types of pulp.

4) The determination of the average degree of polymerization (and other characteristics) of the holocellulose and the pulps.

5) The conversion of the holocellulose and the pulps into nitrates under standardized conditions.

6) The fractionation of the nitrates.

7) The determination of the degree of polymerization of the various fractions.

The wood used consisted of two thoroughly aged black spruce logs. These logs were about 7 inches in diameter and contained about 80 growth rings. The moisture content was 18 per cent.

The sulphite cook was made in a stainless-steel digester, and the alkaline cooks were made in an iron digester. Both digesters had a capacity of about 5,500 grams of oven-dry wood, and both were heated indirectly by means of a liquor circulation system.

Cooking conditions were chosen so that pulps would be produced which possessed characteristics closely approximating those of standard commercial pulps of the same type.

The unbleached pulps were bleached in a three-stage process, consisting of a chlorine water bleach, alkaline extraction, and a final hypochlorite bleach.

All pulps were bleached to a brightness of about 82 per cent. Brightness sheets were made on a British sheet machine, and brightness values were determined with a General Electric reflection meter.

Beater runs were made on both bleached and unbleached pulps according to accepted standards. Handsheets were prepared on a British sheet mold according to TAPPI Standard T 205 m-36. Simultaneously with each set of handsheets, a freeness test was made on a Schopper apparatus, using a 2-gram sample diluted to 1 liter.

Table I — Results of Sulphite, Kraft, and Soda Cooks

	Sulphite	Kraft	Soda
Screened yield on basis of wood, %	45.7	43.6	41.3
Unscreened yield, %	47.7	44.7	45.3
Screenings on unscreened pulp, %	4.3	2.6	8.9
Permanganate number	10.9	21.1	25.8

Table II — Results of Bleaching

	Sulphite	Kraft	Soda
Oven-dry weight of unbleached pulp, g.	800	800	800
Av. chlorine consumed in 1st stage, %	2.75	7.0	8.0
Av. chlorine consumed in 2nd stage, %	1.20	3.25	5.0
Total chlorine consumed, %	3.95	10.25	13.0
Yield in bleaching, %	96.1	96.0	92.8
Over-all yield of bleached pulp on basis of oven-dry wood, %	44.0	41.8	38.4
Over-all yield of bleached pulp on basis of extractive-free wood, %	46.3	44.0	40.5
Brightness, %	83.5	82.9	82.3

Table V — Chemical Properties of Pulps

Sample	TAPPI (Viscosity)	Lignin (Per cent)	Pentosans (Per cent)
Extractive-free wood	.....	27.3	8.0
Unbleached sulphite	116	1.6	4.56
Unbleached kraft	83.5	3.5	8.67
Unbleached soda	27	6.25	5.64
Bleached sulphite	30	.....	4.50
Bleached kraft	11.1	.....	8.38
Bleached soda	6.4	.....	5.67

(1) U. S. Army, Chemical Warfare Service. A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., 1942. This work was carried out under the direction of Emil Heuser.

This is the first installment of abridgments of papers presented at the annual meeting of the **Technical Association of the Pulp and Paper Industry,** held in New York City, February 15-18, 1943. Monthly installments of these abridgments will appear in succeeding issues.

In each case, five sheets for each beating interval were tested according to accepted standards for the following characteristics: basis weight, bursting strength, tearing strength, folding strength (M.I.T.), and tensile strength.

Sawdust was prepared from the sprucewood samples saved from the black spruce logs. This was screened through a series of wire screens of 10, 20, 40, 60, and 80-mesh size. The fraction which passed the 40-mesh and was retained on the 60-mesh screen, as well as that which passed the 60-mesh and was retained on the 80-mesh screen, was kept.

The two fractions were extracted thoroughly with alcohol-benzene, alcohol, and hot water in succession. The extracted material was then thoroughly washed with water, dried in the air, and stored for future use.

Holocellulose was prepared essentially according to the method of Van Beckum and Ritter (Van Beckum, V. G., and Ritter, G. J., *Paper Trade J.* 104, No. 19:49-50, May 13, 1937).

Other tests such as lignin, pentosan, TAPPI viscosity, etc., were made by accepted methods.

The nitration procedure was based on the phosphoric acid method developed by Berl and Rueff (Berl, E., and Rueff, G., *Cellulosechem.* 114:115-119, 1933) and modified by Dolmetsch and Reinecke (Dolmetsch, H., and Reinecke, F., *Zellwolle u. Kunstseiden-Ztg.* 5:219-227, 299-307, 1939).

The nitrating acid had the following composition:

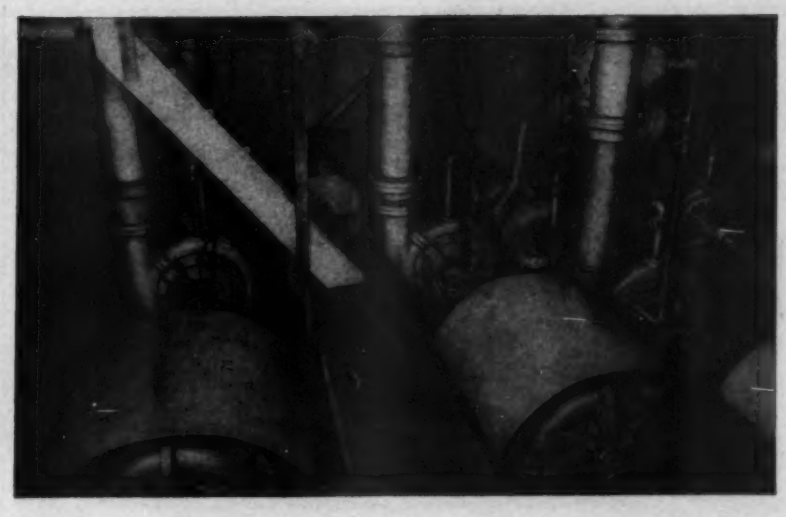
100 parts by weight of 83 per cent phosphoric acid (d. 1.70)
114 parts by weight of phosphorous pentoxide
140 parts by weight of fuming nitric acid (d. 1.52)

Fractionation of cellulose nitrate was carried out by the fractional solution method developed by Dolmetsch and Reinecke, using ethyl acetate and absolute ethyl alcohol in various proportions as the solvent mixtures.

The degree of polymerization of the unfractionated nitrates and of the individual fractions—i.e., the precipitates from the solutions in the alcohol-ethyl acetate mixtures—was determined by dissolving the various nitrates in acetone and determining their specific viscosities according to the method of Staudinger and Mohr (Staudinger, H., and Mohr, R., *Ber.* 70:2296-2309, 1937). The constant level modified Ostwald pipet, as described by Heuser and Green (Heuser, E., and Green, J. W., *Ind. Eng. Chem.* 33:868-872, 1941), was used as a viscometer. The viscosity data were converted into degrees of polymerization by using the Staudinger equation.

The results of the various cooks are given in Table I; the results of bleaching these three pulps are tabulated in Table II; and the chemical properties of the various unbleached and bleached pulps are shown in Table V.

It is ordinarily assumed that the viscosity correlates to some extent with the strength properties of pulps; therefore, it would be expected that the unbleached kraft pulp would have a considerably higher viscosity than any of the other pulps. How-



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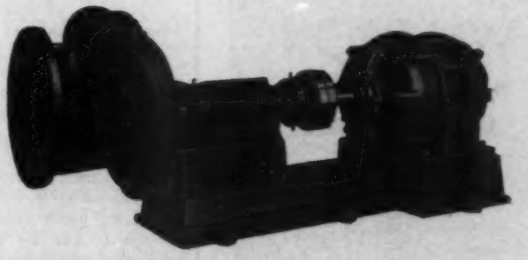

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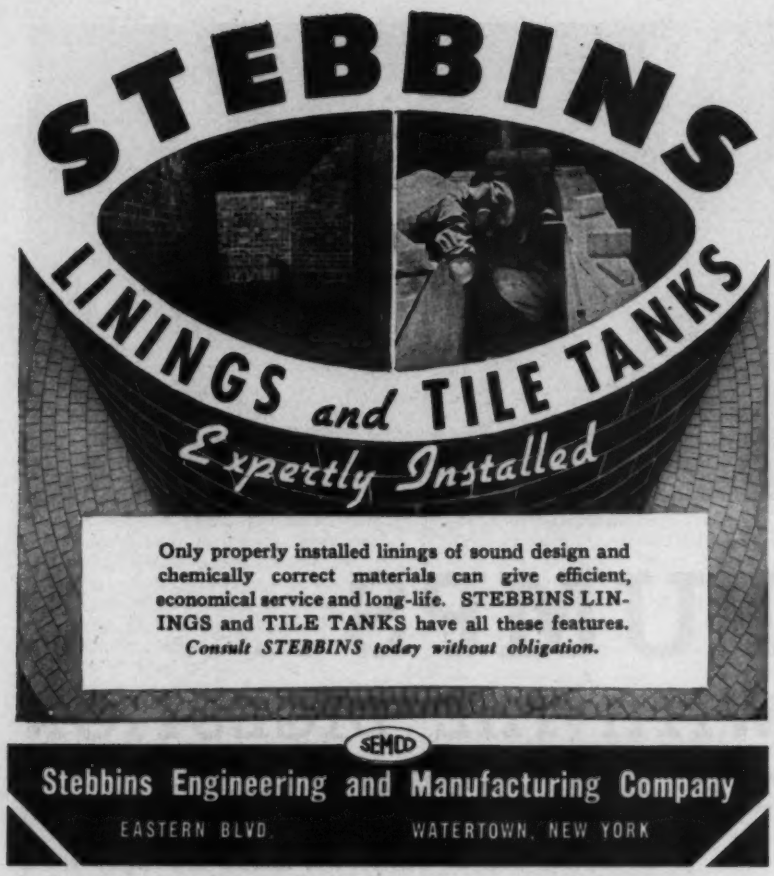
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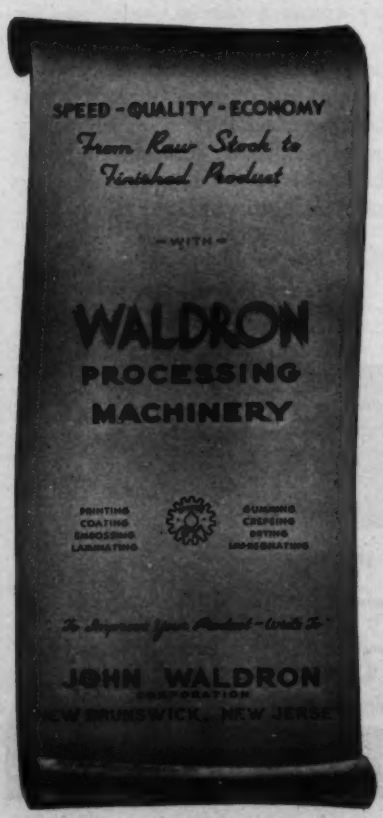

ever, as will be seen from the above results, this is not the case, as the unbleached sulphite pulp has a much higher (TAPPI) viscosity than the kraft pulp. The unbleached soda pulp has an extremely low viscosity as compared with that of the unbleached sulphite; however, its strength properties are higher, except for the fold. In the case of the bleached pulps, the viscosity of the sulphite pulp is considerably higher than that of the kraft pulp, although the strength properties are not so very different for the two pulps.

The lack of direct relationship between the viscosities and the physical strength properties of pulp prepared according to different methods has frequently been observed. It is possible that such influences are exerted by the noncellulosic carbohydrate content of the pulps, these substances having a much shorter average chain length than even substantially degraded cellulose.

If the lignin contents of the unbleached pulps (Table V) are compared with the losses during bleaching (Table II), it is apparent that the bleaching losses were due almost entirely to the removal of lignin.

In the method of Van Beckum and Ritter, the wood meal is subjected to the action of chlorine gas and the chlorinated lignin is removed after each chlorination by extraction with a hot solution of ethanolamine in alcohol. In the present investigation, it was found that, after ten chlorinations, almost all the lignin had been removed from the spruce meal used. The lignin content of the latter was 27.3 per cent, and the yield of holocellulose amounted to 73.2 per cent. To eliminate complications, the holocelluloses used for nitration (and subsequent fractionation) were extracted with hot water.

It has been claimed frequently that chlorine dioxide in the presence of pyridine or other similar bases represents a means for isolating the carbohydrates from wood with less degradation than with chlorine gas. The recent use of aqueous sodium chlorite solution as a delignifying agent for unbleached pulps (Jayme, G., and Mo, S., *Papier-Fabr.* 39:193-199, 1941) suggested that this agent might be substituted for chlorine dioxide for the isolation of the carbohydrate material from wood, because the removal of lignin is actually brought about by chlorine dioxide which is released from the chlorite. The results of tests show that all samples suffered severe degradation in comparison with that caused by the standard chlorine treatment.

Another series was run in which sufficient acetic acid was added to the sodium chlorite solution to bring the *p*H to about 4.5-5.5.

Although the degradation was not nearly so severe as when the same quantity of sodium chlorite was used alone, it was still considerable when the lignin content dropped below about 11.0 per cent. Moreover, it is significant that, even when the lignin content was as high as 13.6 per cent, the material had become completely soluble in cuprammonium solution in contrast to the chlorine holocelluloses which were partly insoluble, even though their lignin content was not higher than 1-2 per cent.

The reproducibility of results, as well as the extent to which the degree of polymerization of the unfractionated nitrate agreed with the average calculated from the degrees of polymerization of the fractions, was established by using the preparations from the bleached sulphite pulp.

In determining the degree of polymerization of the holocellulose nitrates, it was found that they were not completely soluble in acetone after being stirred for several hours and standing overnight. When the time was extended to several days of standing, a somewhat larger quantity went into solution but the degree of polymerization dropped.

The fractionation results show that the two holocellulose preparations represented rather heterogeneous material, consisting chiefly of portions of either a very low or a very high degree of polymerization with only a small percentage in the intermediate range—i.e., 20-27 per cent had a D.P. of 84-90, 5-7 per cent a D.P. of 455-564, about 6 per cent a D.P. of 1059-1433, and the greater part (over 60 per cent, corresponding to about 45 per cent of the extractive-free wood) had a D.P. of 2000-2100. It is very probable that this larger part actually contained portions with a considerably higher D.P. than 2000. On the other hand, the 20-27 per cent having a D.P. of 84-90 contained, no doubt, most of the short-chain noncellulosic carbohydrates. For the same reason, the presence of a considerable percentage of this very short chain material depresses the average D.P. of the holocellulose. In the present investigation, the noncellulosic carbohydrate

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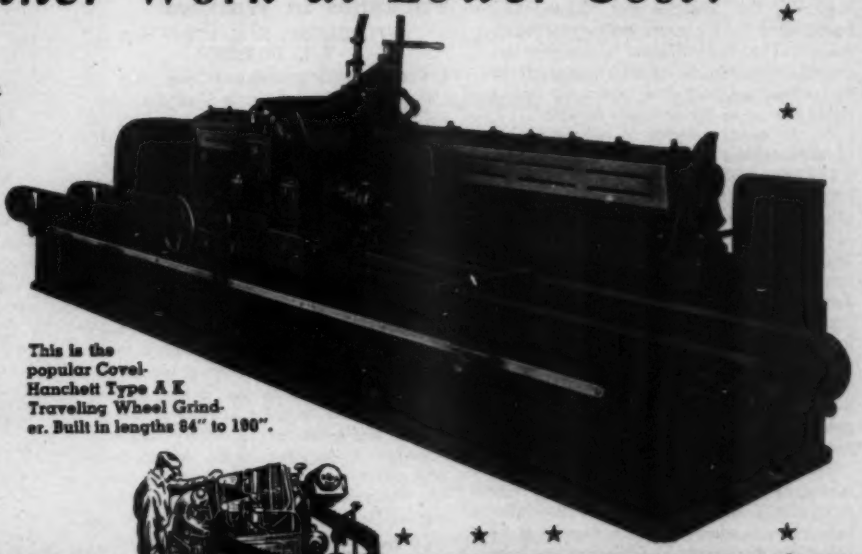

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portion in the holocelluloses was not quantitatively determined; however, the results of a pentosan determination showed that at least 10.6 per cent of the (hot-water extracted) holocelluloses consisted of noncellulosic carbohydrates.

The high degree of polymerization of the sulphite pulp (about 240 units higher than that of the holocellulose) could possibly be explained by the decrease of the noncellulosic carbohydrate content, as indicated by the drop in pentosan content (from 10.6 to 4.36), provided no degradation occurred during cooking. This, however, is quite improbable, and the D.P. of 1,660 would appear to be too high. This probability is supported by the fact that the average D.P. of the sulphite pulp nitrate, as calculated from the D.P. of the individual fractions, is considerably lower (1418). Because the agreement between the calculated and the determined average D.P. was found, in most cases, to be rather close, it may be concluded that the value of 1418 is more nearly correct than the value of 1660. On this basis, the average D.P. of the sulphate and the sulphite pulp would be practically the same.

On bleaching, all three pulps are further degraded, the sulphite pulp to the smallest and the soda pulp to the greatest extent.

A comparison of the chain length distribution of the unbleached pulp with that of the total carbohydrate fraction in the wood shows that the very short chain material had disappeared and the very long chain material had increased. This may be interpreted to mean that, on cooking, the very short chain material was degraded further to a point where it dissolved in the cooking liquor and that, also, a substantial part of the long chain material had undergone degradation. As a result, the material of medium chain length had increased. This equalization occurred to a greater extent with sulphate than with sulphite pulping, and probably accounts to a considerable extent for the better physical strength properties of the sulphate pulp. On the other hand, the soda pulp showed a rather marked difference in the quantity of the medium chain length material (about 40 per cent of the pulp) and that of longer chain length (about 60 per cent).

A comparison of the results of the bleached with those of the unbleached pulps shows that, on bleaching, the reverse of what occurred during cooking took place—i.e., the chain length distribution was more heterogeneous. In the case of the bleached sulphite pulp, the low and medium molecular weight portions seemed to have suffered more than the higher molecular weight portions, because about 49 per cent of the latter still had a D.P. as high as 1800. The kraft pulp was degraded rather severely, practically half of it having a D.P. of only about 1000 and the other half ranging as low as 95-650. No doubt, this degradation can be explained by the attempt to produce a brightness comparable with that of bleached sulphite pulp. In the case of the soda pulp, the portions of low and medium chain length were degraded considerably on bleaching; indeed, the portions having a D.P. higher than about 700, and extending to 1200-1400, had disappeared altogether.

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In order to study the degrading effect of chlorine on pulp, in comparison with the multiple-stage bleaching process employed in the present study, the lignin was removed from a sample of unbleached kraft pulp by the holocellulose procedure. Subsequently, this material was nitrated and fractionated in the same manner as other pulps. The holocellulose procedure removed practically all of the lignin left in the unbleached pulp, but caused no appreciable change in the pentosan content.

As the average degree of polymerization of the unbleached kraft pulp nitrate was 1,450, the indications are that relatively little degradation took place during the chlorination process. The average degree of polymerization of the bleached kraft nitrate was only 718; it is apparent, therefore, that most of the degradation suffered during the bleaching process occurred during the hypochlorite stage, the material being degraded from an average degree of polymerization of 1,215 to 718 in that stage. The observation that hypochlorite bleaching is more detrimental than chlorination is in agreement with general experience.

From a comparison of the results obtained by converting the unbleached kraft pulp into a bleached product by the holocellulose procedure with those obtained by using the three-stage bleaching process, the mildness of the chlorination procedure becomes quite obvious. Indeed, the average chain length distribution of the "holocellulose" thus produced is quite similar to that of the unbleached pulp. This result may be regarded as an additional indication that the carbohydrate fraction had suffered very little degradation during its isolation from the wood meal.

Fiber Cans as Substitute Packages in Wartime

R. P. BIGGER[1], F. H. BOPP[2] and T. E. DOBBINS[3]

Conventional paperboard cans may be classified as either *spirally wound* or *convolutely wound*. In the manufacture of cans of the former type, two or more narrow piles of paper stock to which an adhesive is applied are fed from rolls onto a stationary mandrel at an angle of approximately 45 degrees and are pulled forward and combined by the pressure of an endless belt. This results in the fabrication of a continuous tube, which is automatically cut into convenient lengths by a traveling saw. These tubes are normally of such length as to make from 4 to 10 fiber can bodies when cut to proper height in a subsequent operation. Before or after metal or paper ends are assembled, the can bodies are given any auxiliary treatment necessary to incorporate the desired properties in the can construction. This auxiliary treatment may take the form of flushing or spraying the interior of the can or impregnation of the entire container.

In the winding of *convolute cans*, a web of paper sufficiently wide to make one or more can bodies is fed intermittently onto a revolving mandrel at an angle of 90 degrees to the mandrel. Each revolution of the mandrel results in one ply in the can body and cans are always wound with two or more plies. The bodies are pushed along the mandrel to a label station where labels are automatically applied. The cans are then pushed off the mandrel. Subsequent operations are identical to those used in spiral can production.

Prior to the present emergency nearly all fiber cans were made on one or the other of the above described types of equipment. With the tremendously increased demands on fiber can production, it was necessary to develop new manufacturing methods. The availability of idle metal can machinery has led to the utilization of this equipment in the manufacture of so-called *lap-seam* fiber cans. In this type of container, a body blank or single ply of paper is formed, overlapped slightly, and sealed in a mandrel or horn employing the same sequence of operations as in metal can manufacture. Following this, paperboard or metal ends are applied in the normal manner.

Fiber cans are made either in composite style—i.e., with metal ends, or with paper tops and bottoms. Metal ends are seamed onto the fiber bodies in equipment similar to that used in the production of all-metal cans. The seam used, however, is not the familiar "double seam" found in sanitary cans, in which a flanged body is actually hooked and locked into a curled end, but rather a crimping of the metal end against the paper body wall.

In general, stronger and more adaptable fiber containers can be produced with metal ends.

A variety of all-fiber ends and closures are now being used for products for which metal ends are not allowed. These include paperboard slip-cover caps, curled ends of several types and the more recently introduced seamed and plug-style ends. The seamed end is a paper counterpart of the crimped metal closure, but produced in slightly modified seaming equipment. The plug-style end can be described as a slip-cover cap with a curled edge which is inverted and inserted inside the can body with the curled edge of the cap resting on the end of the can body.

Each of the three general types of fiber cans as described above has both its advantages and disadvantages. The *spirally* wound can is perhaps the most versatile of the three. Spirally wound containers are normally produced only in round form.

In contrast to spiral cans, convolute cans may be produced in rectangular, round, oval, or other forms.

In both of these conventional fiber can types, the protective qualities of the package may be enhanced through the use of specially treated label stocks.

As compared to spiral and convolute cans, lap-seam containers offer both advantages and disadvantages. Since the can body is restricted to one ply of paperboard, the strength of this construction is inherently limited. Theoretically, however, production rates far higher than those possible in the manufacture of spiral or convolute cans should be obtainable with the lap-seam container and, with further development work, the construction may assume an important and permanent place in the industry.

(1) Chemical Engineer, (2) Chemist, (3) Chemist, Research Department, American Can Co., Maywood, Ill.

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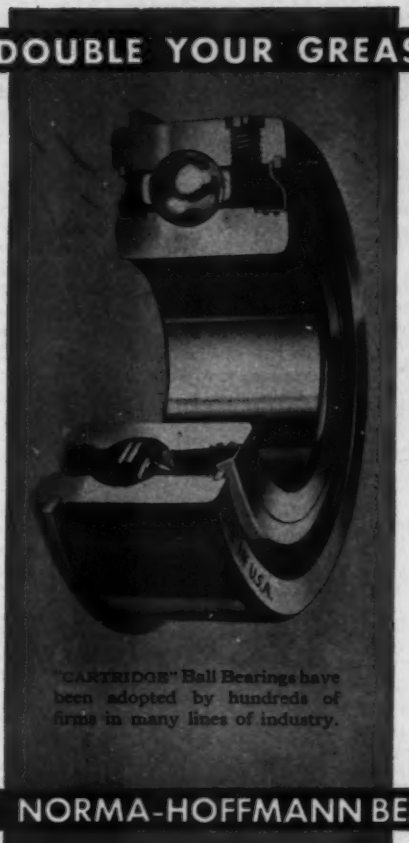

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In considering present problems in fiber container design, it may be well to classify new products which require fiber packages into two groups. The first of these might include those products for which established fiber can constructions, perhaps with slight alterations, have proved satisfactory. In this classification may be placed the considerable number of items which, previous to wartime restrictions, were packed in both metal and fiber cans and which now must be converted in their entirety to fiber containers.

A second group might include those materials, representing a far greater potential volume, for which fiber cans of radically new design have been and are being developed. In addition to paint and motor oil, there are a large number of aqueous, oily, greasy, and alkaline products which must now be converted from metal to new constructions in fiber. Spirally wound, convolutely wound, and lap-seam fiber containers all have found a place in this conversion program. One of the major problems encountered with many of these products is the development of suitable paperboard closures which will permit repeated opening and closing of the containers in the hands of the customer.

In view of the keen competition which will inevitably rule the packaging world after the war, the container of the future will have to offer many advantages at low cost. Advances which have recently been made in the metal can field, such as the development of resistant organic coatings and effective solder fluxes for use in the manufacture of bonderized steel and electrolytic tin plate containers, will be of great importance in this post-war picture. The newer synthetic materials, produced on a more competitive basis, will undoubtedly be put to wide usage.

The fiber can offers certain inherent advantages which, in some cases, are possessed by no other container. It is economical, light in weight and strong; it is not subject to corrosion; it can be made water vaporproof, waterproof, oilproof, greaseproof, acidproof, and alkaliproof; it is easily disposed of; it can be provided with adaptable closures and, when properly made, it is an attractive package. These properties, which have enabled the fiber can to serve in so many wartime uses, should keep it in a place of prominence in the post-war packaging world.

Utilization of Cornstalks in the Manufacture of Paper and Paperboard

SIDNEY D. WELLS[1] and
ROGER L. STELLER[2]

A large amount of work has been done on the conversion of the entire cornstalk into pulp but, since the beginning of the present century, there has been a tendency to develop methods for the separation of the pith from the fibrous portions of cornstalks and to pulp the resulting fibrous portion. The separated pith has been recommended for use as fodder or for other agricultural purposes.

Two general methods have been suggested for the separation of the pith from the fiber: dry separation and wet separation. An example of the dry methods was the mechanical separation patented by Sherwood (Sherwood, George R., U. S. patent 627,882, June 27, 1899) in 1898. A great amount of work on the wet separation of fibers from cornstalks has been done by Drewsen (Drewsen, Viggo, U. S. patent 1,229,422, June 12, 1917), whose latest patent, 1917, proposed the use of fibers in newsprint. One of the most recent methods for the wet separation of pith is that of Wells (Wells, Sidney, D., U. S. patent 2,029,973, Feb. 4, 1936), and it is this method, using the rod mill for the preliminary digestion, which has been used in this investigation.

In the Wells process, the non- and short-fibered constituents are separated from the constituents capable of yielding the fine-fibered pulp after a very mild softening action in which only 30-35 per cent of the vegetable material has gone into solution.

The procedure involved in this investigation was to treat stripped cornstalks in a hot (above 90 C.) rod mill with weak alkali and to screen the resulting semipulp on a gyratory screen using a 40-mesh wire; the pith fraction was thus separated from the fibrous portion. The semipulp was cooked in a rotary digester with an excess of alkali for a comparatively short time for a soda cook, and the resulting black liquor was used for subsequent pretreatment of more cornstalks in the rod mill operation. This pulp was bleached and beater evaluations were run on the bleached pulp. The pith material was mixed with unbleached kraft pulp in percentages varying from 0 to 100 per cent pith, and nine-point board handsheets were made from these mixtures. The procedure thus far followed very closely that developed by Wells and Atchison (Wells, Sidney D., and Atchison, Joseph E., *Paper Trade J.* 112, No. 12:34-38, March 27, 1941; *Tech. Assoc. Papers* 24:114-118, 1941). The ply-adhesion value of the pith material was studied by testing the tear-split force between the plies in duplex sheets of varying mixtures of pith and unbleached kraft, using the method developed by Brown (Brown, Duncan S., *Paper Trade J.* 112, No. 3:33-34, Jan. 16, 1941; *Tech. Assoc. Papers* 23:143-154, 1940), with the attachment for the Elmendorf tear tester designed by Clark (Clark, James d'A., Unpublished work, The Institute of Paper Chemistry). The possible use of the pith material in plastics was investigated very superficially.

The cornstalks were obtained from the Maizewood Insulation Company, Dubuque, Iowa. These stalks were collected and baled in the fall of 1940 and stored at Dubuque for one year.

It is evident from the evaluation of the bleached, fine-fibered cornstalk pulp that a wide range of papers meeting commercial standards can be made from such pulp. Most of these papers can be manufactured with the saving of 50 per cent or more of the power now used in beating and refining the wood pulps now available. The range of grades of papers that can be made readily may be vastly extended by adding small amounts of bleached kraft pulps, bleached and unbleached sulphite, and bleached soda pulps in the furnish. The cornstalk fiber can be used with groundwood pulps in the manufacture of superior lightweight catalogue and rotogravure papers. Such use usually results in better paper than when the cornstalk pulp is replaced by sulphite pulp.

The non- and short-fibered fraction, obtained by passing the product resulting from the treatment of the cornstalks with rods in the presence of hot black liquor over 40-mesh gyratory screens, was too slow to use alone in the manufacture of any standard paper. It also dries irrevers-

(1) Research Associate, The Institute of Paper Chemistry; (2) Goodyear Rubber Company.

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ibly into a hard horny mass which cannot be repulped in the ordinary equipment used to convert dried pulp to slush stock. It possessed to a remarkable degree, however, the power to give bonding and bursting strength and stiffness to unbeaten pulp and old paper mixtures, from which finished corrugating paper and board can be made with very substantial savings in power; it also makes possible the use of waste paper in grades in which it is otherwise incapable of satisfactory use, either for technical or economic reasons.

A few molding trials were made on the non- and short-fibered fraction, thoroughly dried and reduced to powder, with very encouraging results under conditions closely comparable to those used with molding powders now in substantial commercial production.

Five tons of dried cornstalks are required to produce 1 ton of bleached fine-fibered pulp and 1.4 tons of non- and short-fibered pulp. During the past ten years, baled cornstalks, delivered to central points in areas within a 20 mile radius, have been available for not over $7.50 per ton of dry weight. Numerous regions in the central states have more than 40 per cent of the land area planted to corn for a cash crop every year, with no use whatever made of the stalks. Such an area, with a radius of 20 miles and provided with the good roads recently built in the corn country, is capable of supplying over 1,000 tons of dry stalks per day, sufficient for a mill producing 200 tons of bleached fine-fibered pulp and 280 tons of non- and short-fibered material; the latter may be used with an equal quantity of waste papers in the manufacture of 560 tons of corrugating paper per day. It is obvious that units large enough to enjoy efficient and low cost operation are possible.

It would seem advisable to demonstrate on a commercial scale, with the least possible delay, whether the results of the present technical investigations will not be borne out in commercial operation in much the same manner that southern pine has been developed and now furnishes the raw material for over half of the wood pulp being manufactured in the United States.

Rayon and the War

DAN B. WICKER[1]

Since the beginning of the current conflict rayon has contributed to a highly important extent to the country's general welfare.

The dwindling of rayon imports to the vanishing point has transferred to the domestic industry the responsibility of providing increased output to prevent serious shortages and economic upsets. In addition, diversion of natural fibers to war service, and reduction of imports reduced the amounts of such fibers for civilian needs. As a consequence there has been a greatly enlarged use of rayon in the manufacture of woolen, worsted, linen, and other types of fabrics for civilian needs.

There have also been progressively increasing uses of rayon products to fulfill direct war requirements. High tenacity rayon is serving the armed forces excellently for heavy duty truck and airplane tires, uniform and helmet linings, parachute troop uniforms, self-sealing gas tanks, neckerchiefs, insignia, special electrical insulation in planes and submarines, and in other ways.

Accordingly, the impact of war economy and war needs has affected the direction of development of rayon, both with regard to quantitative output and to diversification of use requirements.

Under the influence of dwindling imports the American industry took up the responsibility of domestic demands to produce in 1941 451,204,000 pounds of yarn and 122,025,000 pounds of staple fiber; in 1942 the estimates are 475,000,000 pounds of yarn and 155,000,000 pounds of staple fiber.

To summarize, the figures on wood pulp consumption by the domestic rayon industry, as given in Table III should be illustrative of production trends and of considerable interest to pulp producers.

Before the present emergency arose, special types of rayon had been developed which are characterized by their high strength, toughness and stability. These have proved to be of particular value in the conduct of the war.

Table III — Wood Pulp Consumption by the U. S. Rayon Industry

Year	Tons
1930	72,000
1931	84,000
1932	74,000
1933	115,000
1934	112,000
1935	137,000
1936	151,000
1937	176,000
1938	147,000
1939	194,000
1940	238,000
1941	287,000

Perhaps the most spectacular contribution is that of heavy duty rayon cord tires. The cords in these tires are made of the high strength continuous filament viscose rayon yarn. Due apparently to their smoothness, as compared with short fibered spun yarns, less internal frictional heat is developed. As a consequence there is less deterioration both of the tire fabric and of rubber, especially during the severe service of heavy trucks and buses.

Another important property lies in the fact that these strong rayon tire cords withstand shock very well and show much higher strength when a load is applied suddenly than when it is applied slowly and gradually.

Another adaptation of strong rayon yarn is use in fabrics for self-sealing gas tanks; the fabric serves as an effective support for the soft-sealing plastic.

Strong rayon yarns are also used in making a fabric known as "Tackle Twill." This has the strong rayon in the warp and cotton in the filling, with a weave which exposes only the slippery rayon on one surface. Prior to the emergency the fabric had given such good service on football

(1) Pilot Plant Supervisor, American Viscose Corp.

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Pumps

GPM	Make	Head	Type
5.4	Kewanee	20 ft.	recp.
	Jennings	15 CFM	vac.
10	Yeomans	120	4 st.
20	Yeomans	140	3 st.
75	American	110	2 st.
100	Blackmer		roty.
125	Jennings	180	cent.
150	Gould	90	
50/100			
	Gould	230	roty.
150	Swaby	150	
400	Haydon	100	1 st.
500	Union	140	1 st.
900	Gould	106	1 st.
800	American	325	3 st.
900	Union	70	1 st.

Vacuum Pump

16 x 10 x 12 Union, brass lined cylinders, steel rods with force feed lubricator

Boiler Feed Pump

8½ x 5 x 10 Union, brass lined cyls. steel rods, force feed lubricator.

Motor-Generator Sets

KW	Make	Volts DC	AC
750	Elliott	250 syn	440
300	Westg.	250 syn	2200
225	Westg.	115 syn	2200
225	Ideal	115 syn	2200
150	Ideal	230 syn	440
100	G.E.	3-wire	2200*
100	Al. Chal.	3-wire	2200
100	G.E.	250 ind	2200
100	Wtg.	125 ind	2200
100	Al. Chal.	125 syn	440
75	G.E. '2'	125	3/25/220
75	G.E.	125 syn	220
75	G.E.	250 ind	440
75	G.E.	250 syn	2200
50	Al. Chal.	115 ind	2200
50	Al. Chal.	115 ind	2200*
33	G.E.	110 syn	2200
22½	G.E.	125 ind	220
15	Ideal	240 ind	220
15	G.E.	220 ind	220
7½	Jenny	110	balancer

*Can reconnect 220/440 v.

Vertical

4-60 HP 3/60/2200 1750 RPM
1-40 HP 3/60/440 1800 RPM
1-40 HP 3/60/440 1200 RPM

DC MOTORS, 220 V.

HP	Make	Type	Speed
300	G.E.	MP	425
150	Westg.		750
150	Cr. Wh.	CCM	1100
112	Westg.	SK	1750
100	G.E.	BRM	1640
25/50/100			
	Westg.	SK	175/550/700
75	Westg.	S12L	700
75	G.E.	RC-16	950
75	Northw.	K20	1750
50	Westg.	S12	525
50	G.E.	C	575/1000
50	Ntn.		525
50	Cr. Wh.		650
50	Ideal	HR	66.

Misc. Flange Fittings

2-6" Gate Valves 125#
2-6" Gate Valves 175#
5-6" Ells 90-deg. 125#
4-6" Ells 90-deg. 175#
1-6x6x6" Tee 175#
2 Pcs. 6" x 60" Pipe
2 Pcs. 6" x 56" Pipe
2 Pcs. 6" x 48" Pipe
4 Pcs. 6" x 58" Pipe
5 Pcs. 6" x 30" Pipe
All with 125/175# Cast Iron Standard Flanges each end.

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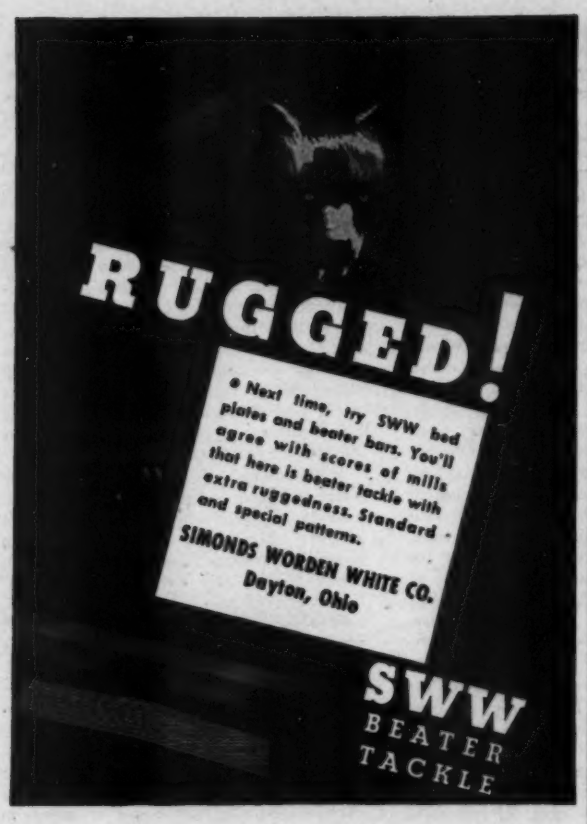
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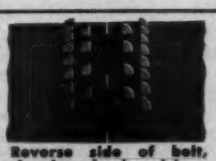

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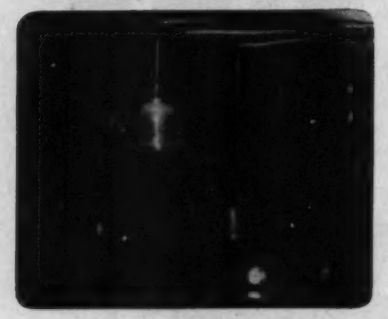

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fields that it was adopted by the Army as standard equipment for its parachute troop uniforms. The primary considerations were its strength, smoothness and resistance to snagging and wear.

There are two well known types of viscose carpet staple in use, namely "Tufton" and "Fiber D." Diminished wool imports has seriously increased the demand for such staple. However, due to rationing of rayon output, only 2,000,000 pounds per year has been available to the carpet trade.

Wool Conservation Order M-176, which became effective August 3, 1942, directed that each producer of viscose or acetate staple fiber should set aside each month such an amount of his production, in excess of priority rated orders, as would be designated by the Director General for Operations for sale of persons processing wool. This staple is then allocated by the Director General among persons eligible to purchase it. During the current year the amount so allocated will probably exceed 15 per cent of the staple fiber available for civilian use. Accordingly, there are being offered for non-war purposes larger quantities of blended fabrics varying in rayon content from 20 per cent to 65 per cent. Also, rayon staple fiber is specified in certain officer's uniform cloth.

War economy has created a demand for large quantities of fabrics of standard shades having a high degree of color fastness. In response to this demand rayon has offered the "spun-dyed" type. By taking advantage of ability to incorporate coloring materials prior to, or during, the formation of the filaments, rayon manufacturers have produced shades of such fastness that the color can be removed or faded only by treatments so drastic as to destroy the utility of the material.

The beneficial effects of economic stability upon national morale and well being cannot be overestimated. In this regard rayon has made its contribution. Rayon filament yarns have, since the beginning of hostilities, experienced only minor price readjustments and viscose staple fiber has maintained an absolutely stable price since 1937.

Development of Weatherproof Solid-Fiber and Corrugated Shipping Containers Designed for Overseas Shipment

E. R. HANKINS, President
Hankins Container Co.

Due to the global nature of this war and the necessity of transportation of supplies and equipment to the far-flung posts now being occupied by our fighting men, shipping cases are required that not only stand up under exceedingly rough handling over long journeys, but which can also be unloaded from transports into the surf and stored in the open in all kinds of weather, from frigid Russia to the torrid heat of Africa. The importance of foodstuffs in this war, which have become even more of a factor than the fighting equipment itself, makes it imperative that they be transported in containers that will insure good condition upon arrival at destination. The difficulties, of course, are increased by the fact that many shipments are transshipped, either by boat, by rail, or by any other modes of transportation available, and, consequently, the containers must be developed to withstand any conditions developed by any emergency.

To develop these factors in either corrugated or solid-fiber boxes, a more water-resisting paperboard than was ever thought possible must be used. The mills have tackled this problem, and, after many experimental runs, have succeeded in producing a board that far exceeds in water-resistant qualities anything ever produced for use in shipping containers. This paperboard, which is very closely knit in the forming, is a condensed sheet treated with waterproofing chemicals that cause it to retain a good portion of its strength while being submerged in water and regain its strength upon drying.

It is obvious that in addition to the water-resisting paperboards, in order to have a completely weatherproof box, an adhesive that would continue to perform under water was required. The starch manufacturers came through with a modified starch adhesive, obtained by the addition of urea-formaldehyde. This type of glue is now being used on both solid-fiber and corrugated shipping cases. The solid-fiber box, however, on account of its construction and the very nature of the materials used, is more water-resisting in the early stages of immersion than the corrugated fiber box, due to the fact that the corrugations are not unlike irrigation ditches, allowing the water to come in contact with a greater area of the paper used.

In the fabrication of liners for corrugated boxes experiments so far conducted have involved the use of single thickness as well as multiple-ply liners. This experience has proven that multiple plies laminated together with waterproof glue give the best results and that the more plies used to a given thickness of completed board, the better the water-resisting qualities. Corrugated boxes are now being made with multiple plies of kraft paperboard—both the facing sheet and corrugating member. The facings are being laminated away from the corrugating machine on a separate operation and consist of two or more plies of 0.010 inch paper. The corrugating member is laminated on special equipment, placed just ahead of the corrugator, or just before the two sheets enter the corrugating rolls, and usually consists of two 0.010 inch sheets. Extensive tests made of containers manufactured by this process show that the boxes possess exceedingly strong characteristics.

It was necessary that certain standards be established to which solid-fiber and corrugated boxes could be developed to meet government requirements. Many tests were conducted, such as drum tests, surf tests, and drop tests. We are all familiar with drum tests and drop tests. The surf test was a special test conducted at the seashore, in which boxes representing samples submitted by various manufacturers were anchored in the surf by means of weights attached to ropes approximately 30 feet long. The result was that the boxes were carried in with the waves and carried out again as the waves receded, being subject to the excessive pressure of the water

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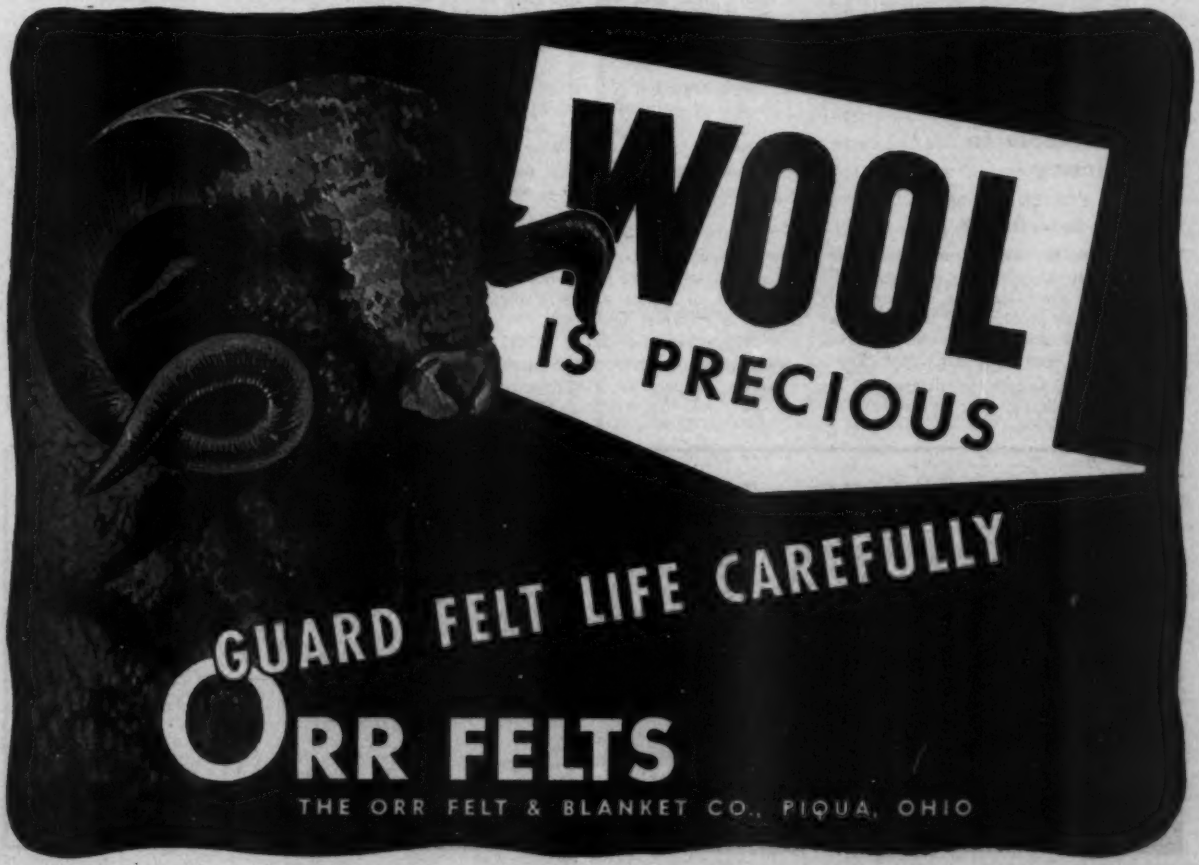

and also the abrasive action of the sand. As a result of these many tests the following standards were established: first—a dry burst (Mullen) test of 750 pounds; second—a wet burst (after 24 hours immersion) of 500 pounds; third—drop test (after 24 hours immersion) on completely filled boxes from 30 inches height on all of the corners, to a total of twelve drops. Using these tests as a standard, the all-kraft solid-fiber box made with five plies stood up better than other grades and was adopted by the Government for carrying canned goods for our Army and Lend-Lease where the shipment had to be re-handled and transported great distances; in other words, involving trans-shipment. Modification of these standards has since been made permitting the use of an additional three grades of boxes designed to conform to the requirements under less difficult shipping conditions, such as port to port foreign shipments involving such commodities as writing paper and other articles which are less subject to damage, and domestic shipments.

Tentative specifications issued by the office of the Quartermaster General, dated December 2, 1942, No. 93, provide for four groups of boxes involving both corrugated and solid fiber; designed to meet their requirements for the shipping of different commodities under various conditions.

Copies of this specification are available upon request to the office of the Quartermaster General.

The glue used for the sealing of the flaps is similar in nature to that used in laminating and in corrugating in that it is the urea-formaldehyde formation involving the use of modified starches. It can be secured in two types—one for hand application and one for machine application.

Some Factors in Detergency

FOSTER DEE SNELL
Foster D. Snell, Inc.

Detergency has several merits as a subject. It is so complex that no one really knows much about it. It is so thoroughly mixed up with problems of chemistry that practically any statement can be disproved by citation of some contradictory factor.

The known factors in detergency are (1) Inititl alkalinity or *p*H of the detergent solution, (2) Total alkalinity or buffer value of the detergent solution, (3) Effect in lowering of interfacial tension between the soil and water and (4) Deflocculating and emulsifying power.

Dirt which adheres closely is coated with at least a monomolecular film of oil or grease. One may call it oil to avoid confusion with compounded greases used for lubrication. All such dirt is essentially acid in nature because all saponifiable oils are acid.

Practically all cleaning materials used industrially are alkaline. Perhaps that statement is open to question until explained, and of course there are exceptions Soap is the most common cleaning material. The *p*H of a soap solution free from excess alkali or builders is 10.2. So it is alkaline with respect to the usual neutral point of *p*H 7.0.

For purpose of discussion, one conveniently refers to *p*H 10.2 as the neutral point of soap. Any *p*H lower than that means partial decomposition, any higher one means that alkali or builder has been added.

But to return to alkalinity, why are so many detergents alkaline? The answer is because alkaline cleaning materials react with the fatty acid in the soil to form soap *in situ*.

Soil is more readily removed by a strongly alkaline washing solution than by a weakly alkaline one. As measured by *p*H the first factor is the initial alkalinity. Thus a solution of borax and soap is not as effective as a solution of soda ash and soap. And soda ash and soap is not as effective as sodium metasilicate and soap. That is generally true, the problem is to explain why.

But since the soil is acid it is going to destroy some alkalinity so that the next factor is total alkalinity above *p*H 10.2 if soap is being used. Why above 10.2? Because that is the neutral point of soap. When it falls below 10.2, soap is being destroyed. Builder costs 2-5c per pound, soap over 10c. So that is bad economics.

This factor of total available alkalinity is sometimes phrased as buffer action. If limited to buffer action above *p*H 10.2 that is a correct description.

These two factors of initial alkalinity and total alkalinity can be nicely evaluated from comparative electrometric titration curves of the builders being compared. And, by the way, don't forget that *p*H is logarithmic not linear.

The next factor is what is sometimes called wetting power. The subject is complicated by interrelation of factors. When soil is displaced from a surface it is wet and floated off. But interfacial tension between a solid and a liquid generally cannot be measured. Hence, it is fortunate that soil can be visualized as having a surface with the properties of a liquid, the oil film on its surface. This factor then is readily measured by the stalagmometer method using a mixture of equal parts of mineral oil and vegetable oil with a known acidity as one liquid, the built soap solution as the other.

On the basis of initial and available alkalinity or lowering in interfacial tension the order of decreasing activity of builders when added to soap is sodium hydroxide, sodium orthosilicate, sodium metasilicate, trisodium phosphate, sodium carbonate, modified soda, sodium chloride and borax. One could predict that series except the location of sodium chloride above borax. What about a neutral soil? No results at all in lowering of interfacial tension, values the same as for pure water if soap is not present. What does the builder do when soap is present but acidity is not? According to a complex equilibrium arising from the law of mass action it drives the soap from the form of dissolved and ionized soap toward micellar soap.

The soil must be loosened from the surface. Then it must be dispersed as discrete particles or deflocculated. Then it must be floated away, emulsifying power.

Trisodium phosphate and the silicates are most efficient. This is not unexpected since those are known to be better deflocculating agents than other alkalies. For deflocculating and emulsifying power the formation of soap micellae is not helpful. But it does not hinder either. More detergents fail in this property than in any other one. Lack of it results in redeposition of the soil at another point.

The alkyl sulphates, keryl benzene sulphonates and related surface-active compounds have become prominent in the past several years for wetting out textiles and multitudes of other applications. They possess the factors of lowering of interfacial tension and deflocculating and emulsifying power. Special forms are stable to

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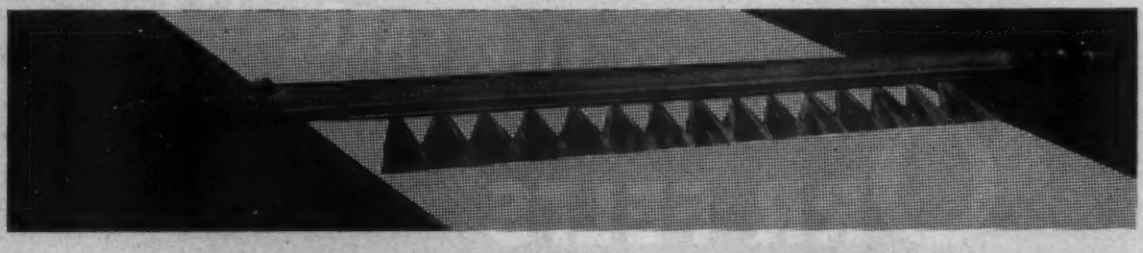

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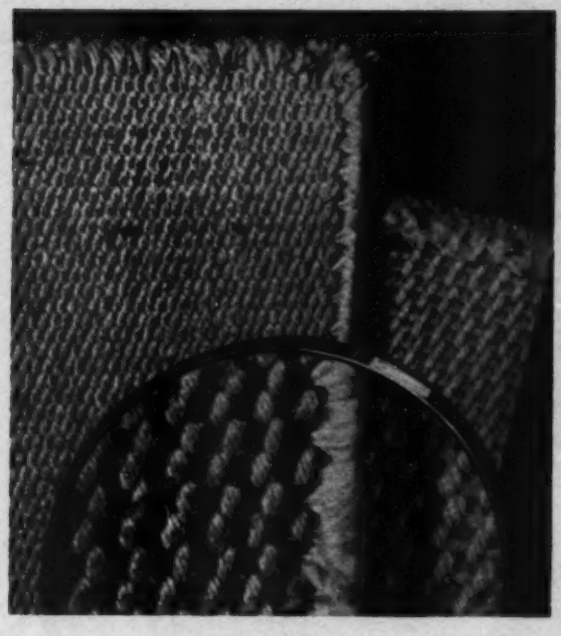

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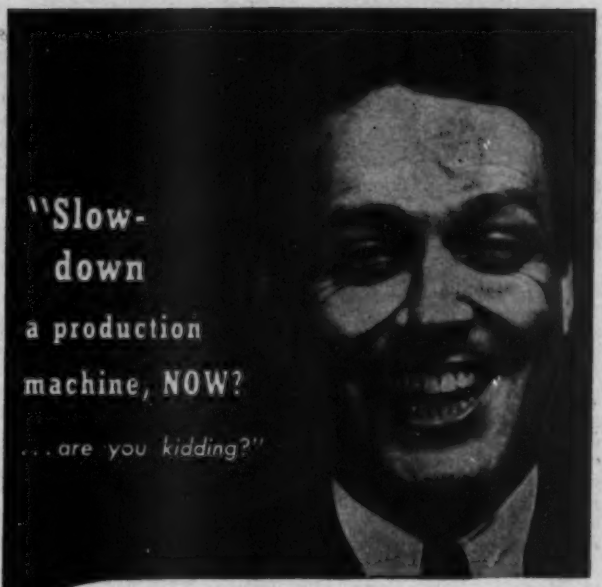

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strong alkali. In particular uses such agents are very effective.

In short, detergency as the broad subject includes soap formation, wetting power and deflocculating and emulsifying power.

War Time Government Specifications for Paper and Envelopes

M. S. KANTROWITZ[1] and R. H. SIMMONS[2]

In accordance with Section 3 of the Government Printing Act of 1895, the Joint Committee on Printing of the United States Congress fixes standards of paper for the public printing and binding.

The Committee on Paper Specifications of the Joint Committee on Printing is composed of the Clerk of the Joint Committee on Printing, who serves in the capacity of chairman; the chief of Printing and Processing, Work Project Administration; the printing clerk of the Post Office Department; the inspector of paper and material for Joint Committee on Printing; the chief of the paper section of the National Bureau of Standards, United States Department of Commerce; and three officials of the United States Printing Office—namely, the technical director, the director of purchases, and the chief storekeeper. This committee prepares specifications on paper for public printing and binding and recommends their adoption to the Joint Committee on Printing of the United States Congress.

The Paper Technical Committee is appointed by the Federal Specifications Executive Committee of the Procurement Division, Treasury Department, of which committee the director of the National Bureau of Standards serves as chairman. The Paper Technical Committee is composed of the chief of the paper section of the National Bureau of Standards as chairman, the technical director of the Government Printing Office as vice chairman, and representatives chosen from the interested governmental executive departments.

This committee prepares specifications for the purchase by various government departments of such papers as blueprint, carbon paper, cross section and drawing papers, teletype, and many others pertaining to special processes or purposes for use in the field services and in the departmental services where Government Printing Office specifications do not exist.

The specifications originate either upon the request of the Procurement Division of the Treasury Department or upon request of any one government department.

In order to minimize duplication of work and to avoid inconsistency in Government paper specifications, the Federal Specifications Executive Committee, in the year 1930 adopted the specifications of the Joint Committee on Printing of Congress as Federal Specifications, wherever they may be applicable and specified that revisions whenever made by the Joint Committee on Printing of Congress, be automatically included in the most recently printed federal specifications. Therefore, all federal specifications pertaining to grades of paper which are carried on the current Government Printing Office paper schedule are to all intent and purposes identical with the specifications given in that schedule.

In backing the war effort, which demands every possible means of accomplishment and with economic interests in view for the conservation of chlorine, unbleached pulp has been substituted for bleached pulp not to exceed 35 per cent of the furnish in sulphite papers wherever and to whatever degree utilitarian considerations permit without detriment to essential printing.

The specifications for all chemical wood writing, manifold, bond, ledger, and index papers formerly permitted a maximum of 2 per cent ash. Effective January 1, 1943, the specifications for these types of papers have been changed to permit 5 per cent ash in the finished product, provided that the paper fillers are not of an abrasive character so as to cause excessive wear of ruling pens or printing plates. Under such conditions paper manufacturers can use 5 per cent filler to replace 5 per cent of chemical wood pulp in paper to be furnished for Government. By such means a considerable quantity of chemical wood pulp has been made available for diversion to direct war uses.

Some manufacturers stated they were ready to offer the Government Printing Office machine-coated book paper listed in the paper schedule, but were prevented from doing so because of the existing prohibition against groundwood content. The introduction of groundwood pulp into mimeograph was also requested.

In view of the shortage of sulphite pulp it was found necessary to permit approximately 60 per cent groundwood pulp in these grades of paper.

Another means of conserving pulp instituted by the Government was the elimination of the use of heavyweight paper where not actually necessary. For example: the substitution of 40- for 48- pound bond; 64- for 80- and 88-pound ledgers; 280- for 362-pound index; 120- for 160-pound super-calendered book; and, 100- for 120-pound machine coated paper, released to the market large amounts of pulp and saved freight, weight and pulp in the overall conservation program that is necessary in the industry at this time.

The brightness ceilings ordered by the War Production Board are given in General Limitation, Order L-XI.

The restrictions on the brightness ceilings of 100 per cent rag content paper were removed August 1, 1942, by the War Production Board. Top brightness for this particular paper was originally fixed at 82 per cent. It was determined that it would contribute almost nothing to the conservation of chlorine by reducing the brightness of this grade of paper.

The instruments recognized by the War Production Board for making brightness are the General Electric reflection meter or brightness tester and the Hunter multipurpose reflectometer.

A simplification and standardization program was issued by the Director of Indus-

(1) Technical director, and (2) associate chemist, United States Government Printing Office.

LOOK
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are doing an important job in over 250 pulp and paper mills.
Objectionable dirt is removed at low cost from pulp and paper making stocks.
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Sand, grit and abrasive materials—the saboteurs of fourdrinier wires and felts are eliminated.
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IN WARTIME when wires and felts are hard to get—this is of great value, as records show these vital materials last from 10 to 35% longer in VORTRAP equipped mills.
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50 WALL TOWER NEW YORK, N. Y.
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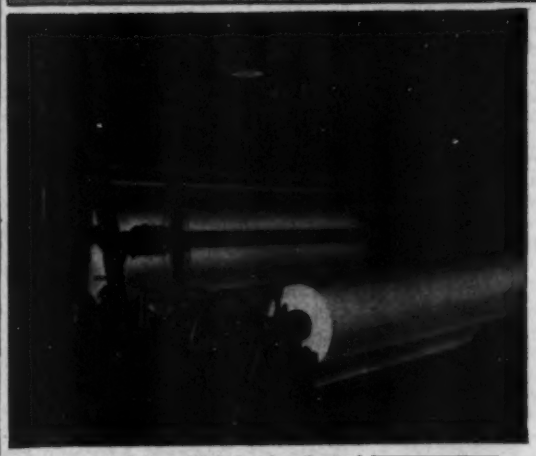
"more evenly wound rolls"

SAYS ST. CROIX PAPER COMPANY



Cameron Mill-Type Web Tension Control insures uniform density of rewound rolls and fewer web breaks. Water-cooled friction device prevents overheating at high speeds.

"In comparison with the manual control of tension, we have found that your Constant Tension Unwind Stands give more evenly wound rolls; all rolls wound the same, as the tension is always the same, whereas with manual control it depends on the man operating the winder; less winder breaks; and better starts at the core."

Thus the St. Croix Paper Company, Woodland, Maine, well expresses some of the outstanding features of Camachine Constant Tension Unwind Stands. Additional data about these machines are available in an interesting folder, with detailed illustrations and drawings, which is available on request.

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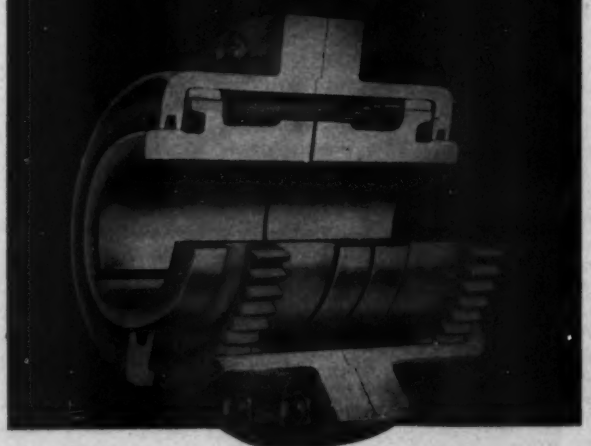

A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

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try Operations of the War Production Board in the form of a series of schedules contained in Limitation Order L-120. This order became effective July 24, 1942, was revised October 29, 1942, and amended November 30, 1942. The specifications in this program affect grades, colors, sizes, and weights of:

1) book papers used in commercial printing
2) book papers used in the book publishing field
3) fine writing paper
4) chemical wood pulp tablet paper
5) envelope papers

Newsprint, wrapping papers, paperboard, and many types of specialty and industrial papers are not affected by this program.

Schedule VI was added to Limitation Order L-120 on November 30, 1942, standardizing and simplifying the manufacture of roll toilet tissue and provided that toilet rolls be compressed in order to save shipping space and container board. It embodied the following conservation measures:

1) Reduction of toilet tissue from 18 to 14 pounds basis weight.

2) Elimination from manufacture of all rolls less than 650-sheet count.

3) Elimination of inside carton packing and individual wrapping in multiple roll units.

4) The winding of toilet rolls as tightly as equipment will permit, collapsing the roll, and designing cases so as to load cars to visible capacity.

Schedules 7, 8, and 9 of Order L-120, standardizing and simplifying commercial envelopes, paper stationery and tablets, notebooks, pads, and looseleaf fillers are now in preparation by the War Production Board.

A comparison of Government Printing Office paper sizes with those recommended by the War Production Board was made, and it was found that Government Printing Office sizes, although well standardized within the office, did not entirely correspond to commercial practices.

This can be illustrated by the fact that the Government standard letterhead size is now 8 by 10½ inches, cut from a 21x30-inch sheet instead of 8½x11 inches, a size cut from a 17x22-inch sheet, and also by the fact that our most common Government publication sizes are 5⅞x9½ inches, sometimes in the Government Printing Office called "document" or small book size, and 9⅛x11⅜ inches, sometimes called "census" quarto size, both of which are not in accord with general commercial practice, but are standard throughout the Government service.

Restrictions on sizes are not applicable to orders of more than 5,000 pounds. Since the Government Printing Office purchases much of its paper in carload lots the sizes used by that office are in conformity with the limitation order.

The Container Co-ordinating Committee of the War Production Board has issued (October 20, 1942) a 150-page book of Army-Navy general specifications for packaging, packing and marking for overseas shipment (U. S. Army No. 100-14, Navy Spec. No. 39 P-16). This supersedes 100 SSC-(A) on ordnance storage and shipment charts which has been revised and is being printed by the Government Printing Office.

This has been approved by the Army, Navy, War Production Board, Lend-Lease Administration, Agricultural Marketing Administration, and the U. S. Treasury Procurement Division. It covers most materials purchased by government agencies, except ammunition, aircraft material, subsistence items, and clothing.

A new class of specifications for paper and other materials is now issued by the Federal Specifications Executive Committee. These are termed emergency alternate federal specifications. They contain changes in the specifications made for temporary use for the conservation of strategic and critical materials and to take care of other supply problems arising from the war. These are issued in mimeographed form and can be obtained without charge from the Federal Catalog Division, Room 572, Procurement Division Building, Washington, D. C.

The Post Office Department purchases all envelopes used by the Government that are printed in the course of manufacture and other postal paper supplies. The specifications are formulated by the department.

Plain envelopes for use by the Government Printing Office and other government departments are purchased on specifications issued by the Government Printing Office.

Although the Federal Specifications Executive Committee requires that the federal specifications wherever applicable shall be identical with those of the Government Printing Office, the Post Office Department specifications for envelopes differed from those used by the Government Printing Office for the same grades of paper involved in their manufacture.

The specifications for envelopes used by the Post Office Department in some instances permitted lower bursting strength values than the Government Printing Office Specifications. They also did not include requirements for folding endurance and acidity. This has at times placed the Government Printing Office in an embarrassing position since the envelope manufacturers, because of the less rigid specifications of the Post Office Department have preferred to bid on contracts for the Post Office Department rather than upon those of the Government Printing Office.

We have found through careful study and research that the folding endurance test is most indicative of quality. With specifications in which both folding endurance and bursting strength requirements are stated, the folding endurance is most important, and paper meeting this requirement will usually comply with bursting strength specified. However, paper which will meet the bursting strength requirement will not always comply with the folding endurance specified.

The *p*H value requirement was formerly included in the Government Printing Office specifications for kraft envelopes due to the fact that some government departments, particularly Archives, use large quantities of kraft envelopes for filing purposes. The *p*H requirement for special purposes is important from the standpoint of permanence but is not important for envelopes used for mailing purposes. It is difficult to segregate the kraft envelopes used for filing from those used for mailing.

In view of the national emergency and in the interests of unification of Government specifications the Government Printing Office suspended for the duration of the emergency period the *p*H and folding endurance requirements in the specifications for all envelopes purchased by this Office. This brought the Government Printing Office Specifications for envelopes in conformity with those used by the Post Office Department.

The requirement for the construction of envelopes has been broadened to permit the use of side seam as well as diagonal seam.

The weights of some of the envelopes have been reduced for the purpose of economizing on the raw materials entering into their manufacture. Some envelope sizes found no longer necessary have been eliminated.

The Effect of Small Additions of Bleach Liquor on the Bacterial Content of Sulphite Pulp

JOHN W. APPLING[1] and BERNARD F. SHEMA[2]

It is generally accepted that completely bleached pulps have a very low bacterial content. In fact, they are usually sterile as they leave the bleaching operation. This low bacterial content has been considered an asset in the manufacture of paper used for food packaging. In view of the fact that partial bleaching has become necessary, it was decided to study the effect of small additions of bleach liquor on the bacterial content of sulphite pulp.

The procedure followed for bleaching was very similar to that described by Koon (Koon, C. M., *Paper Trade J.* 111, No. 6:34-36, Aug. 8, 1940; *Tech. Assoc. Papers* 23:222-224, 1940) for determining the bleach requirement of pulp. The deviations from this procedure were: (a) the pulp consistency was 5 per cent, which approximates closely that used in bleachers; (b) the water bath temperature was 40 ± 1 deg. C., which is more favorable for bacterial growth; and (c) the jars of pulp and bleach liquor were shaken vigorously by hand at approximately 5-minute intervals. Unbleached spruce sulphite pulp having a high bacterial content was selected for this first experiment.

Although the unbleached pulp had a high bacterial content (4,720,000 per gram), most of the bacteria were readily killed by chlorine, because 2 per cent bleach (on the basis of a 35 per cent bleach powder) appeared to be practically as effective as higher concentrations.

An unbleached sulphite pulp of low bacterial content was selected for the remaining experiments. At first it was believed that its bacterial content of 1,150 per gram might be neglected in view of the fact

(1) Research Associate, The Institute of Paper Chemistry; (2) Technical Assistant, The Institute of Paper Chemistry.

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that large numbers of known spore-forming bacteria were to be added prior to the treatment with the bleach liquor. The increments of bleach used were 2, 8, and 16 per cent (on the basis of 35 per cent bleach powder).

The results obtained were difficult to interpret because of the unknown effect of the bacteria which were originally present. Accordingly, a second series was set up in which it was attempted to sterilize the pulp prior to its inoculation. Four different species of bacteria were used, three of which were spore forming and heat resistant. The fourth was included as an example of nonspore-forming bacteria, which was not heat resistant. The results were still difficult to interpret quantitatively. There was an excellent survival of all three spore-forming bacteria after exposure to the 2 per cent bleach. There was a slight survival after exposure to the 8 per cent bleach and, in two cases, to the 16 per cent bleach. On the other hand, there was only a slight survival of the nonspore-forming species after exposure to the 2 per cent bleach and no survival after exposure to the 8 and 16 per cent bleach.

In view of the fact that complete sterility was not obtained after one sterilization period, it was decided to subject the pulp to three consecutive periods of sterilization, with time intervals of 24 and 72 hours, respectively. Even after the third sterilization period, complete sterility was not obtained; however, the bacterial content was only 165 bacteria per gram.

This work was carried out with the cooperation of the Pulping Division of the Institute. The assistance of C. M. Koon and Philip Bloom is gratefully acknowledged.

Association Reports . . . .

1942 Review and 1943 Forecast for the Kraft Paper Manufacturing Industry*

WILLARD J. DIXON, President
Kraft Paper Association

▶▶▶ DURING 1942 THE KRAFT PAPER industry established a new record for production for the fourth consecutive year. The increase was not large, amounting to only 3 per cent, but considering the governmental regulations and natural difficulties during the latter part of the year, the new record can be considered a real achievement. Beset on the one hand by increasing manpower and vital raw material shortages and on the other by a constantly changing market from civilian into war requirements, the industry's 1942 production record was proof of its high adaptability.

The year opened with a high rate of operations and pressure for greater volume of output continued well into the second quarter of the year. The third week of April saw the industry produce more kraft paper than in any seven day period in its history. The accelerated decline from these capacity operations to 66 per cent of operations during December requires explanation.

The decline in production was due to two causes. The first of these was a sharp decline in orders for kraft paper; the second was the limitations placed upon production itself.

It is difficult to present a forecast for 1943. Latest estimates are that more than 80 per cent of present kraft paper production goes into war and the most important remaining civilian uses. Through its new Order M-241-a, the WPB has ordered the discontinuance of production of paper products currently deemed by it to be nonessential. Of the 23 major products included in its list, none is made exclusively of kraft paper.

There is no question in the minds of the manufacturers and certain government agencies of how thoroughly kraft paper has adapted itself to total war.

The demand for kraft paper in 1943 should equal that of 1942. Wrapping paper requirements for Lend-Lease, food and supply shipments for our armies and industrial wrappings for the many war products should compensate for the reduced civilian requirements for wrappers. Multiwall sack requirements are increasing constantly. Food rationing forecasts many small unit purchases by every housewife with the small paper bag as the probable solution to this new packaging problem. As for the many specialized converting papers, their 1943 demand should keep step with the over-all American production of armaments, ordnance supplies and equipment. We may also be expected to be called upon to provide substitutes for other scarcer materials. We can foresee no decrease in total kraft paper demand in 1943.

How well the kraft paper industry will fare in obtaining critical materials for its continued operation in 1943 is a question which cannot now be answered. Rubber rolls, copper screens and all types of heavy metal parts must be replaced from time to time. Our paper mills are continuous units wherein one break can stop the operations of an entire mill. Our requirements are not large but the results can be serious if these few needs are not carefully provided for under the new Controlled Materials Plan.

Newsprint Paper in North America—1942*

ROYAL S. KELLOGG, Secretary
News Print Service Bureau

▶▶▶ THE FIRST FULL YEAR of participation in total war by the United States has just closed. Canada has had over three years of it. The continent is now in completely with ever increasing tempo. Under these circumstances there is no point whatever in attempting to draw comparisons in the use of any commodity with reference to normal times.

Involvement in global war is less disastrous to the manufacturers of paper than to the producers of many other commodities. Paper in its uncounted uses is essential to a large degree in modern life in either peace or war. On the other hand, the entire plant and personnel of a paper mill are not susceptible to transformation into direct war production as are many other manufacturing enterprises. It is mostly pulp and paper—or nothing.

Production of all kinds of paper and paperboard in North America in 1942 was about 20,500,000 tons. This is a remarkable record for wartime. Continental newsprint production was 378,000 tons less than in the preceding year. This decrease was due chiefly to inability to reach former overseas markets. But little of the decrease was because of lessened domestic demand.

The falling off in newsprint consumption in North America was less than the reduction in the size of newspapers caused by small advertising volume. Obviously this was because world-shaking events kept newspaper circulations at all-time high levels.

Some of the detailed statistical information on the paper industry usually available at this time of year cannot now be obtained because of government restrictions in Washington and Ottawa. Reliable industry sources, however, largely fill the gap.

Production of newsprint paper in North America in 1942 was 4,407,000 tons, a decrease of 7.9 per cent from the output in 1941. But the 1941 production was the largest in any normal year. The ten-year average production—1933 to 1942—was 4,237,000 tons, so the current record stands up well in comparison.

The continental supply of newsprint last year was, in round numbers, made to the extent of 72 per cent or 3,177,000 tons in Canada, 22 per cent or 953,000 tons in the United States, and 277,000 tons or 6 per cent in Newfoundland. The decrease from the preceding year was 7 per cent in Canada, 6 per cent in the United States, and nearly 20 per cent in Newfoundland. The latter, of course, was the direct result of the hazards and difficulties of ocean shipping.

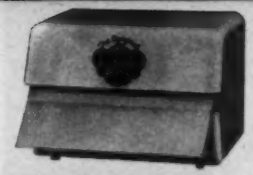
The 4,407,000 tons of newsprint run off from North American machines last year was about 75 per cent of the present generally assumed industry capacity of 5,840,000 tons yearly.

Shipments during the year exceeded production by 32,000 tons, so that mill stocks in the three countries, which totaled 200,000 tons at the end of 1941, were reduced to 168,000 tons on December 31, 1942.

Already official action has constrained the publishers to a newsprint consumption at the 1941 rate, and the operating ratio of the newsprint mills has been set at 10 per cent less than in the six months preceding March 31, 1942. These ordered reductions in consumption and production may be only an entering wedge for much greater restrictions as the war effort increases in intensity.

It is impossible at this time to make a forecast of any value as to what the total newsprint consumption in the United States will reckon up to twelve months hence. If it is a long dreary war year, consumption will necessarily go down. If, as the optimists think, a big success comes in 1943, consumption will jump soon thereafter.

(*) Abridged.



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NEW EQUIPMENT AND SUPPLIES

Electric-Powered Tree Faller

E. C. Atkins and Co., Indianapolis, Ind., has announced a power driven saw, the *Atkins-Hassler Electric Tree Faller,* for falling, bucking and limbing operations. The teeth of the saw are attached to an endless roller chain which revolves about an oval cutting bar. The chain is powered by an electric motor positioned at one end of the cutter bar. Power for the motor is supplied through a cable from a tractor- or skid-mounted generator which may be located as much as 1,000 feet away from the saw. Weighing only 85 lb., the 46 in. saw is stated by the manufacturer to be the lightest chain saw available. Among the claims made for the saw by the manufacturer are the following: faster felling, lower stumps, less inventory in down timber, less fire hazard, and less insurance.

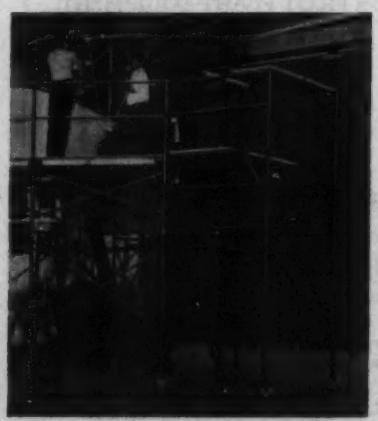
Car Door Opener

A freight car door opener that operates on a positive lever principle has been announced by Industrial Products Co., 2820 N. Fourth St., Philadelphia. To open a door, the end of chain is hooked to ladder

rung on car; the opener hook, on car door handle. Then, a series of short quick pulls on the center of the chain opens the door. To close door, operation is reversed. The device weighs only 15 lb. and is known as the *Ipco Car Door Opener.*

Steel Scaffolding

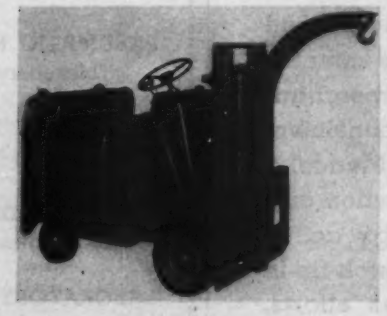
A system of scientifically designed steel scaffolding has been announced by Safeway Steel Products, Inc., Milwaukee, Wis. The



basic unit consists of two end frames, which, when erected, are held rigidly together by two cross braces. This forms a complete unit 5 ft. wide, 7 ft. long, and 5 ft. high. Desired heights are obtained by adding similar units to the basic unit through the use of coupling pins. Additional lengths are made by adding frames and fastening them together with cross braces. The scaffolding may be used for both interior and exterior work in old plant modernization, in maintenance work, and in new construction activities. The complete system may be stationary or portable, as required.

Special Attachment for Lift Truck

Towmotor Co., 1226 East 152nd St., Cleveland, Ohio, has announced a special attachment for use with its fork-type trucks. Consisting of a crane arm and



hook, the attachment is demountable and interchangeable with standard forks. Its use permits loads ordinarily handled on crane hooks to be raised from the floor for carrying and to be moved rapidly into position with a minimum of labor.

Industrial Dermatitis Preventive

Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, as exclusive distributor, has announced *FEND* creams and lotions for protecting workers' skins against industrial dermatitis. Consisting of cosmetically-safe materials, these products (six different types) are easy to apply, and are readily removed with mild soap and warm water.

Plastic Paint

Calumet Plastic Co., Inc., 4724 Calumet Ave., Hammond, Ind., has announced a paint for application to concrete surfaces, both interior and exterior, which is so plastic that cracks, splits, and joints of reasonable size remain sealed by it. Likewise, according to the manufacturer, through its use, even damp concrete floors are sealed tight against dampness and concrete dust. Application is by brush or spray gun.

Asphalt Composition Floor Runner

The Philip Carey Manufacturing Co., Lockland, Cincinnati, Ohio, has announced an asphalt composition floor runner for factories, offices, halls and recreation rooms.

Corrugations or ribs on the top surface of the runner form a non-skid surface. Designated as *Carey Corrugated Floor Runner,* it is available in rolls 36 inches wide and 30 feet long.

Companion products made of the same material are corrugated floor mats in sizes 2 ft. x 3 ft., 3 ft. x 4 ft., and 3 ft. x 6 ft.; and corrugated treads for stairways in sizes 4 in. x 18 in., and 9 in. x 24 in.

Paint for Concrete Surfaces

Colorthru Chemicals, 20 West 45th St., New York City, has announced *Colorthru* as a product that penetrates, waterproofs, and preserves floors or walls of concrete and brick as well as other structural materials. In making use of *Colorthru,* no priming coat is necessary. It can be applied with brush or spray gun. One gallon covers approximately 400 sq. ft. It is available in the following colors: battleship grey, universal grey, tile red, medium green, brown, black, and white.

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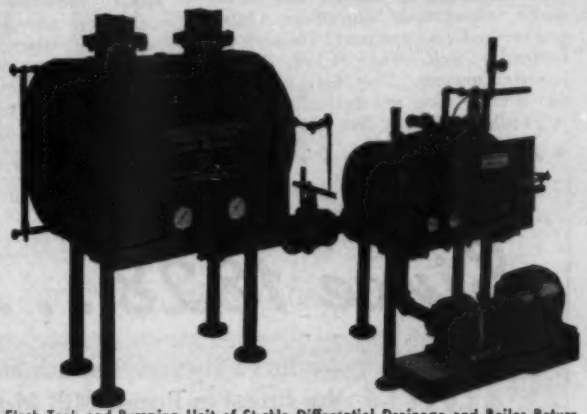

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Stickle Visible Micro Adjustable Orifice. Also supplied with Indicating Thermometer.

• Stickle Equipment for drainage and control eliminates production problems which decrease operating efficiency and increase the cost of manufacturing. Stickle Drainage returns condensate to boilers or feed water heaters with a minimum loss in heat—saving fuel and increasing boiler capacity. Stickle Automatic Differential Valve provides an exact differential in pressure between the two sections of paper machines and insures efficient drainage at all pressures—enabling machines to operate at maximum volume. Stickle Automatic Tension and Thermal Control combined with Stickle Micro Adjustable Orifice maintains moisture control within limits of a fractional per cent., stabilizes steam flow, saves steam—besides permitting accurate modulated control with visible check.

Today, these advantages are important not merely to the paper mills which have this equipment but to the entire nation. Fuel saving, as one example, is more than a reduction in cost for paper mills—it releases fuel for other vital industries and contributes relief to an over-burdened transportation system.

Maintain Your Stickle Equipment —It May Not Be Replaceable

A careful check of your Stickle Equipment by a Stickle maintenance engineer may be in order. With proper care it can be kept in "top" condition at small cost. Neglect may create more expensive repairs, or call for replacements extremely difficult to obtain.

STICKLE
STEAM SPECIALTIES COMPANY
2225 Valley Avenue INDIANAPOLIS, INDIANA

TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Nitroparaffins as Solvents in Coatings

The following solvents are now on the market: nitromethane, nitroethane, 1-nitropropane, and 2-nitropropane. Their odor is inoffensive; their toxicity is low; they are powerful solvents. They have a medium rate of evaporation, and their inflammability is actually lower than that of hydrocarbon solvents and ketones and esters with similar rates of evaporation, and this despite the fact that they contain nitro-groups. They present interesting possibilities. For example, the nitropropanes will dissolve a number of waxes, natural resins, pitches, and a very large series of synthetic resins, as well as cellulose derivatives (for the esters of which they are among the best solvents). They dissolve fat soluble dyes, many oils, and a large number of organic chemicals. On the other hand, they do not dissolve methyl cellulose, dextrin, gelatin, or casein, roofing pitch, and a number of other commodities. Their solvent action on cellulose acetate and acetobutyrate, however, is especially noteworthy. Solutions of these materials allow appreciable proportions of cheap diluents, including hydrocarbons and alcohols to be added. Their rates of evaporation make it possible to obtain finishes which duplicate those of nitrocellulose for drying speed and leveling properties. The customary combinations of "fast" and "extra-slow" evaporating solvents are no longer necessary to obtain satisfactory films.

The nitroparaffins also show marked solvent strength for vinyl copolymer resins and are being used widely in this field. They show possibilities in the solution of many other coating problems as well. These are discussed. The authors give eleven suggestive tables and two graphs which give the viscosity ranges of cellulose acetopropionate solutions in nitropropane-butanol mixtures containing various percentages of toluene, as compared with solutions in butyl acetate butanol solution. Similarly, viscosities of vinylite resin in methyl isobutyl ketone (containing toluene) are compared with those in nitroparaffin solvents containing toluene. Eleven very recent references are given. Charles Bogin and H. L. Wampner. Ind. Eng. Chem. 34, No. 9, 1091 (1942).

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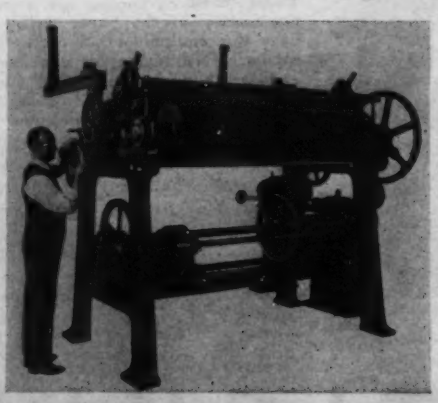

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Chemical Composition of Pulp and Its Relation to Strength

When sulphite cooks were made with beechwood at temperatures not above 105 deg. C., a product was obtained which, after bleaching with sodium chlorite, gave a pulp with a high degree of whiteness and a yield of about 70%. When this was beaten to 47.5 deg. S. R., the resultant paper showed a breaking length of 5,088 meters, but had the low folding endurance of 12 double folds. The latter is ascribed to the high lignin and hemicellulose content. The finding that past a certain point the percentage of lignin causes a decrease in the strength of the sheet is not a new one. It simply confirms older data.

On the other hand, the finding that a high hemicellulose content also decreases the paper strength is evidently new. Apparently the paper develops its maximum strength at an optimum hemicellulose content. By removing the residual lignin and the hemicellulose step by step, by treatment with caustic soda, the strength values reach a certain maximum, which, however, is not at the same point for all the strength properties. The best all around pulp was obtained when the yield reached 50%. A sheet made from this pulp contained about 78.4% alpha cellulose, and 11.7% material soluble in 17.5% alkali, besides 0.86% lignin. The authors give 21 references as well as diagrams and tables, but unfortunately the article is available only in the form of a Swedish abstract. G. Jayme and E. Lochmuller-Kerler. Holz, Roh-u Werkstoff 5, No 1,10-19 (1942) though Svensk Paperstidn. 45, No 10,207 (May 1942) and B. I. P. C. (January 1943, in press).

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PAPERMAKING PATENTS

IN THE UNITED STATES — Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Drier

Patent No. 2,285,290. Frank J. Lang, Niagara Falls, N. Y., assignor to International Paper Company, New York, N. Y., a corporation of New York. Application June 21, 1940, Serial No. 341,653. 2 Claims. (Cl. 34—114). In a continuous web drier having a plurality of cylinders over which the web is carried, laterally extending open-ended pockets defined by the cylinders and web, and means associated with said pockets and including pairs of generally opposed unrestricted horizontally disposed air pipes having their open, inner ends disposed in overlapping relation and terminating in the central portions of said pockets for discharging streams of air in a direction parallel to the web and slightly spaced therefrom to thereby carry moisture laden air entrapped in the central portions thereof outwardly towards the ends thereof whereby the moisture content adjacent the central portion of the web will be decreased and the moisture content adjacent the edge portions of the web will be increased to thereby effect a substantially uniform moisture gradient across the full width of the web, said pipes being disposed in substantial parallelism with respect to said web whereby said currents of air will not impinge on the web.

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Multiple Strand Fourdrinier Wire

Patent No. 2,288,512. William E. Buchanan, Appleton, Wis., assignor to Appleton Wire Works, Inc., Appleton, Wis., a corporation of Wisconsin. Application June 5, 1939, Serial No. 277,483. 4 Claims. (Cl. 139—425). A wire fabric for paper-making machines, comprising interwoven warp and weft wires, at least some of said wires each comprising a core of relatively soft metal and a surrounding casing of harder metal.

Electrically Conductive Paper and Method of Producing the Same

Patent No. 2,283,558. Bernard L. Kline, Manhasset, N. Y., assignor to The Western Union Telegraph Company, New York, N. Y., a corporation of New York. Application June 18, 1937, Serial No. 149,024. 17 Claims. (Cl. 204—2). An electrically conductive paper product comprising a sheet of paper having a solid solution of an electrolyte dissolved in a solid oxygen containing solvent formed in the body of said sheet.

Paper Making Machine

Patent No. 2,284,098. Richard T. Lang, Heidenheim-on-the-Brenz, Germany, assignor to American Voith Contact Co., Inc., New York, N. Y., a corporation of New York. Application August 19, 1936, Serial No. 96,838. In Germany August 19, 1935. 3 Claims. (Cl. 92—44). In a high speed paper making machine, having a breast roll and a sieve passing over the same, the combination of a stationary open stock box with a nozzle fixed thereto at its lowermost end in which the lower lip is stationary and the upper lip is pivotally movable to vary the depth of the stock jet formed thereby, the stock being nevertheless at a constant inclination to the horizontal, means for moving the breast roll vertically and horizontally for inclining the sieve immediately after passing over the breast roll in respect to the stock jet, in its forward movement, for regulating the position of impingement of said stock jet upon that portion of the sieve and the direction of the sieve in respect to said stock jet, and a supporting roll resting against the lower part of the sieve during its return movement for tensioning the sieve depending upon the amount of the aforesaid change in the inclination of the wire at the breast roll, whereby the sieve may be so inclined in respect to the stock jet that the stock is placed upon the sieve without piling up or cascading.

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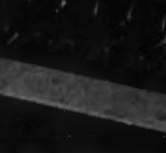

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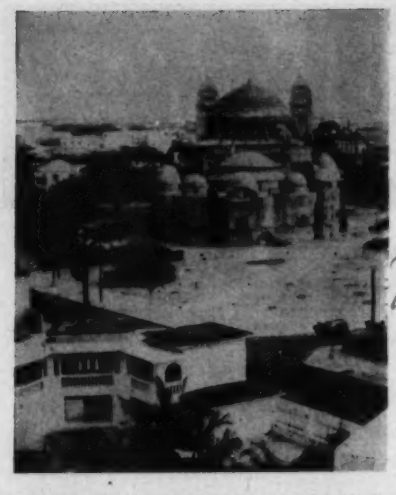

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Layne Wells and Pumps are in use throughout the African War Zone. They were chosen from a field of world wide competitive makes. The reasons for their selection are quite obvious: more skilfully designed, more ruggedly built and more efficient in operation. In war as in peace, their dependability has never faltered.

Tremendous quantities of well water is an absolute war necessity and today hundreds of speedily installed Layne Wells and Pumps are serving aircraft makers, ordnance works, munition factories, chemical plants, ship yards, flying fields, troop training areas and navy yards. Present production is now nearly 100 percent for the war needs, but every effort is being made to keep private and municipal installations in operation.

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Layne-Western Co. of Minn.	Minneapolis, Minn.
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New Catalogues and Publications

Asten-Hill Mfg. Co., Philadelphia—"Dryer Felt Seams" is the title of a recent publication by Asten-Hill. The booklet discusses the various types of seams used with Asten dryer felts. The information is grouped under the sections entitled, Sewed Seams, Riveted Seams, Endless Felts, Glued Seams, and Clipper Seams. Under each of these main sections are found examples, which are clearly described and pictured.

Metallizing Engrg. Co., Inc., Long Island City, N. Y.—A new operation manual has just been published, and covers completely every phase of metallizing from surface preparation to spraying and final finishing. There are five main sections in this 48-page book—Surface Preparation, Spraying Technique, Corrosion-Resistant Coatings, Finishing Sprayed Metal, and Metallizing Wires. Surface Preparation covers such subjects as how to blast clean, undercut, key and dovetail; how to provide the maximum bond on both cylindrical and flat surface, etc. The second section explains how to avoid loosening or cracking of the sprayed coating. Corrosion-Resistant Coatings contains information on how to apply all corrosion-resistant metals, and also gives a table of suggested metals and thicknesses for specific applications. Copies are available.

Dixon Crucible Co., Inc., Jersey City, N. J.—Dixon Graphite Products is the name of a new 32-page booklet which describes the various graphite products manufactured by this company. Illustrations and descriptions of the products are given, and the booklet is indexed for ease in finding the desired information. Copies are available.

Massax Laboratories, Hackensack, N. J.—A new Graphite Lubrication Handbook is now available. The Handbook explains the work which graphite performs and lists the various products supplied. There is an indexed list of applications which the lubrication engineer will find helpful in keeping his machines at the peak of performance. Copies are available.

Permutit Co., New York City—After nearly 30 years' experience with the application of ion exchangers to water conditioning processes, this company has recently gone into the field of ion exchange for non-water conditioning uses, which is described in a new publication, "Ion Exchangers for Industrial Processes."

Roller-Smith Co., Bethlehem, Pa.—Horizontal drawout metal-clad switchgear units in 100,000; 150,000 and 250,000 KVA capacities at 5,000 and 15,000 volts are described and illustrated in a new Catalogue, No. 1110. The advantages of metal-clad switchgear in safety, reliability, and ease of installation and maintenance are pointed out. Complete dimensional data on the various types of gear available also is included. Copies are available.

Swartwout Co., Cleveland, Ohio—A new catalogue, Bulletin No. 217, has just been issued by Swartwout. It describes the "NCM" line of roof ventilators made of non-critical materials. The ventilator designs of these ventilators are patterned after the original metal Swartwout ventilators and are for use in essential applications where metal is not vitally necessary. The booklet pictures and describes the various units.

Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.—"Wartime Conservation," a new 96-page booklet just published by Westinghouse, contains recommendations by their engineers for selecting, applying, and using electrical equipment so as to achieve the best possible output with the greatest saving in critical materials. The book covers uprating of motors, thermal temperature loading of transformers, industrial network systems, line equipment and materials; and gives tips on saving and salvaging materials as practiced in the various Westinghouse plants. All recommendations are in line with policies suggested by the WPB for the conservation of critical materials. A copy of Booklet No. B-3206 may be secured from Department 7-N-20 of this company.

Wheelco Instruments Co., Chicago—Five new bulletins have just been published by this company describing its complete line of industrial indicating, recording, and control thermometers. Bulletin No. G23-2 discusses the operating principle of Wheelco thermometers and gives information to aid in selecting the proper instrument for a certain application. Bulletin No. G503-2 covers the company's recording control thermometer, while G603-2 is on the Wheelco indicating control thermometer. Bulletin No. G303-2 describes and gives applications for the company's indicating thermometer, while Bulletin No. G403-2 covers its recording thermometer.

Books

Papermaking—The History and Technique of an Ancient Craft—The author of this volume, Dard Hunter, has been assembling material relating to the ancient craft of papermaking for more than 35 years. His researches in this work have taken him into all parts of the world, the findings from which have been incorporated in ten books that have been published during this period. For the most part, these books were expensively printed upon handmade paper in limited editions and all of them are now out of print.

The present volume embraces a selection of material from the previous editions with the addition of a store of material not previously used. It is a book of more than 400 pages, marvelously well-illustrated.

The book opens with a map revealing that the journey of papermaking from China to Europe required 1,000 years and chronicling the years when papermaking was introduced in various European countries as well as in a number of states of the United States. It closes with a chronology of paper and allied subjects (2700 B. C. to A. D. 1942), a bibliography of 150 works on papermaking, and a splendid index. The illustrations, in addition to the map already referred to and to a frontispiece, total 162. Many of these illustrations are most unusual. All of the text matter romantically portrays the development of papermaking from the days before paper and of its invention to modern times, the chronology being preceded by a chapter on modern papermaking materials and a chapter comparing handmade and machine made papers. Published by Alfred A. Knopf, Inc., 501 Madison Ave., New York, N. Y., the book is priced at $4.50 a copy.

Association Reports

All of the orders which affect the industry emanate from the OPA and WPB and clear through the office of E. W. Tinker, executive secretary of the American Paper and Pulp Association. Copies of all government orders are sent by the Association to members. Listed below are releases sent out during February by the APPA. Any correspondence with that office regarding these releases should carry identifying listing and numbers under "Federal Regulations."

Materials and Supplies No. 2—M-103 Dyestuffs.

Materials and Supplies No. 4—Conservation Order M-261—As Amended February 4, 1943.

Materials and Supplies No. 5—Controlled Materials Plan—Regulation No. 5 (Maintenance, Repair, and Operating Supplies).

Paper Production No. 7—M-241-a (Amended February 8, 1943).

Paper Production No. 8—M-241—Amendment.

Paper Production No. 9—M-241 (Amended February 23, 1943).

Labor-Overtime Order 9240—No. 2—Interpretative Bulletin No. 1 of Executive Order 9240.

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Blue Overalls	5.25 to 5.50
Corduroy	3.00 to 3.25
Cottons—	
Washables, No. 1	2.85 to 3.10
Fancy Percales	4.25 to 4.50
New Soft Blacks	3.50 to 3.75
New Light Seconds	2.65 to 2.85
New Dark Seconds	2.40 to 2.60
Khaki Cuttings—	
Mixed	3.00 to 3.25
O. D.	3.50 to 3.75
New White Canvas	6.75 to 7.25
New Mixed Blacks	2.75 to 3.00
Shirt Cuttings—	
New White No. 1	6.75 to 7.00
Silesias No. 1	5.25 to 5.50
New Unbleached	7.00 to 7.25
Fancy	3.75 to 4.00
Linen Cuttings—	
White	14.75 to 15.25
Grey	14.50 to 15.00

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f. o. b. New York City

OLD RAGS

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	per ton
Roofing—	
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)
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NEW RAGS — *per cwt.*

New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City

OLD RAGS — *per cwt.*

No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shapperies	

ROPE and BAGGING
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Gunny No. 1—	*per cwt.*
Foreign	Nominal
Domestic	4.25 to 4.50
Wool Tares—	*per cwt.*
Light	4.00 to 4.25
Heavy	4.25 to 4.50
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
No. 1 large	–*115.00
No. 1 small	–*105.00
Sisal Rope—	
No. 1 large	–*95.00
No. 1 small	–*85.00
New Burlap Cuttings	5.75 to 6.25
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	–*80.00
No. 2 sisal	–*80.00
Soft Jute	4.75 to 5.00
Mixed	1.25 to 1.50

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER
F. O. B. New York City

	per ton
Shavings—	
White Env. Cuts, One-Cut	67.50–
Hard White Env. Cuts	62.50–
Hard White, Unruled	57.50–
Soft White, One-Cut	57.50–
Soft White, Misc.	43.00–
Fly Leaf, No. 1	33.50–
Fly Leaf, Woody, No. 1	25.00–
No. 2 Mixed Col. Woody	18.00–
Flat Stock—	
No. 1 Heavy Magazines	33.50–
Mixed Books	16.00 to 17.00
Ledger Stock—	
No. 1 White	43.50–
No. 1 Mixed (Colored)	37.50–
Manilas—	
New Env. Cuttings	53.00–
New Env. Cuts, One-Cut	57.50–
Extra Manilas	37.00–
Manila Tab Cards, Free of Ground Wood	45.00–
Ground Wood Manila Tab Cards	27.00–
Kraft—	
Envelope Cuttings	65.00–
Mixed Env. or Bag Cuts	55.00–
Tripled Sorted No. 1 Brown	50.00–
New 100% Cor. Cuts	45.00–
No. 1 Old Assorted	35.00–
News—	
White Blank	33.00–
Overissue	15.00 to 16.00
No. 1 Baled	14.00 to 15.00
Old Kraft Corrugated Containers	30.00–
Old Corrugated Boxes	16.50–
New Corrugated Cuts	17.00 to 18.00
Mill Wrappers	14.00 to 15.00
Box Board Chips	13.00 to 14.00
No. 1 Mixed Paper	13.00 to 14.00

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25–
Ground, cwt.	4.00–
Powdered, cwt.	4.40–
Blaze Fire—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to –
Bleaching Powder—	
Drums, cwt.	2.25 to 3.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	19.00 to 20.00
80-100 mesh (bags), lb.	19.50 to 20.50
Argentine, lb.	—
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	12.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	15.00 to 20.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	18.25 to 18.75
Litharge, powd., bbl., lb.	.09 to –
Rosin (Gum)—	
New York, per 100 lbs.	
E	3.85–
F	3.97–
G	4.03–
WW	4.64–
Rosin (Wood), carlots	3.05–
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 –
Ground and flake, drums, cwt.	2.70 –
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.10–
Pearl, barrels, cwt.	3.20–
Paper (Sp.) bags, cwt.	3.20–
barrels, cwt.	3.30–
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05½ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	.08¼ to .08½

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OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo.:

Bleached softwood sulphite	78.00
Unbleached softwood sulphite	66.00
Bleached hardwood sulphite	73.50
Unbleached hardwood sulphite	63.50
Bleached Mitscherlich sulphite	81.00
Unbleached Mitscherlich sulphite	72.00
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Standard news print sideruns	46.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda pulp	66.00
Unbleached soda pulp	62.00
Ground wood pulp	46.00
Sulphite screenings	38.50
Sulphate screenings	38.00
Ground wood screenings	30.00
Northern unbleached sulphate sideruns	73.00
Southern unbleached sulphate sideruns	63.50

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	per ton
Boards—	
Binders	84.00–
Chip	45.00–
Chip, sgl. mla. lined	60.00–
Coated, white patent	
.016	80.00–
.020 and heavier	75.00–
Kraft liner	60.00–
News	45.00–
Book (cased)	*per cwt.*
No. 1 Coated	15.50–
No. 2 Coated	14.00–
No. 3 Coated	13.25–
No. 4 Coated	12.75–
No. 2 Offset	11.00–
A Grade Super	10.75–
B Grade Super	10.25–
Bonds (Rag Content)—	
100% Rag	*per cwt.*
Ext. No. 1	42.50 to 46.00
100% Rag	35.00 to 37.75
85% Rag	
75% Rag	25.00 to 27.00
65% Rag	
50% Rag	20.80 to 23.75
25% Rag	18.20 to 20.00
Regular Colors	1.00 cwt. extra
Bonds (Sulphite)—	*per cwt.*
No. 1	11.70–
No. 2	10.75–
No. 4	9.90–
Colors	1.00 cwt. extra
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Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50
Ledgers (Rag Content)—	
100% Rag	*per cwt.*
Ext. No. 1	41.40 to 48.50
100% Rag	36.25 to 39.25
85% Rag	32.20 to 37.75
75% Rag	26.25 to 28.00
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50% Rag	22.10 to 24.25
25% Rag	19.50 to 21.50
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	*per cwt.*
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No. 2	12.05–
No. 4	11.20–
News—	*per ton*
Rolls (Contract)	54.00–
Rolls (Spot)	(nominal)
Sheets	62.00–
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White, No. 2	1.00–
Bleached Anti-Tarnish	1.15–
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(10,000 lbs.)	7.50 to 7.75
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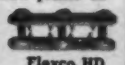

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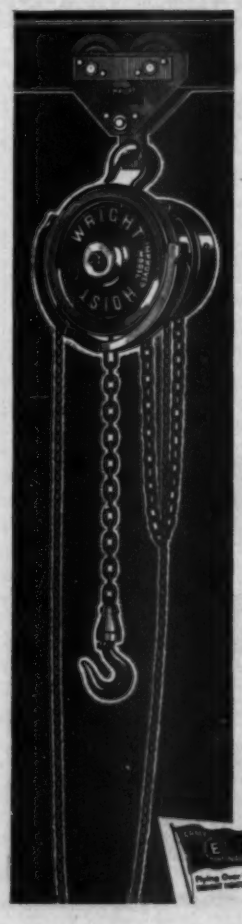

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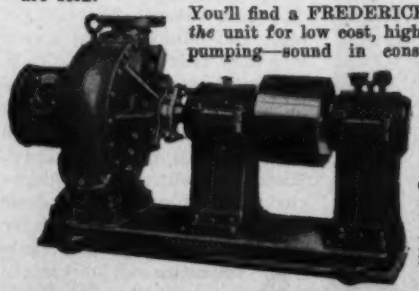

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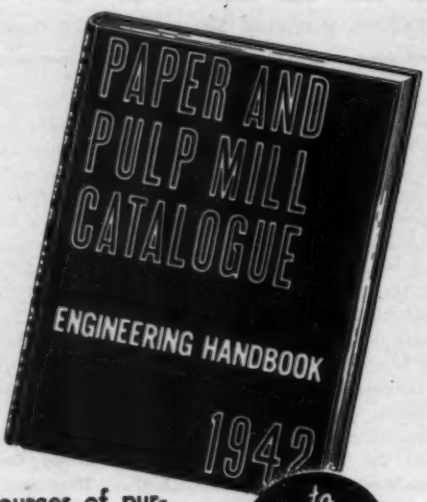

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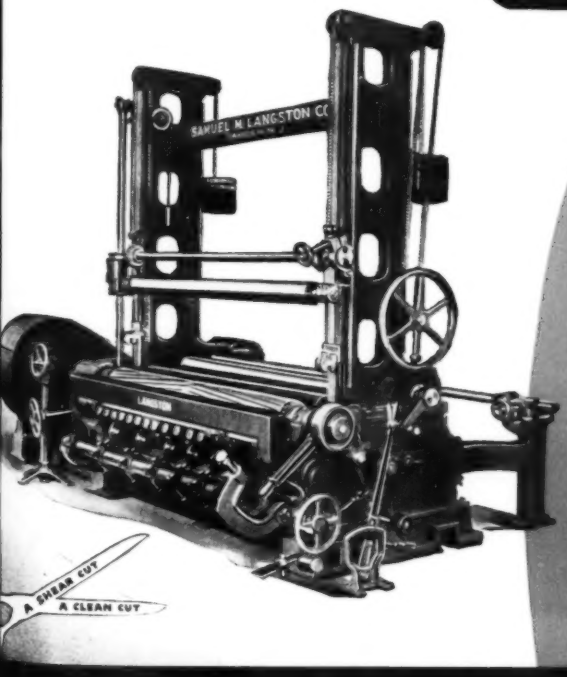

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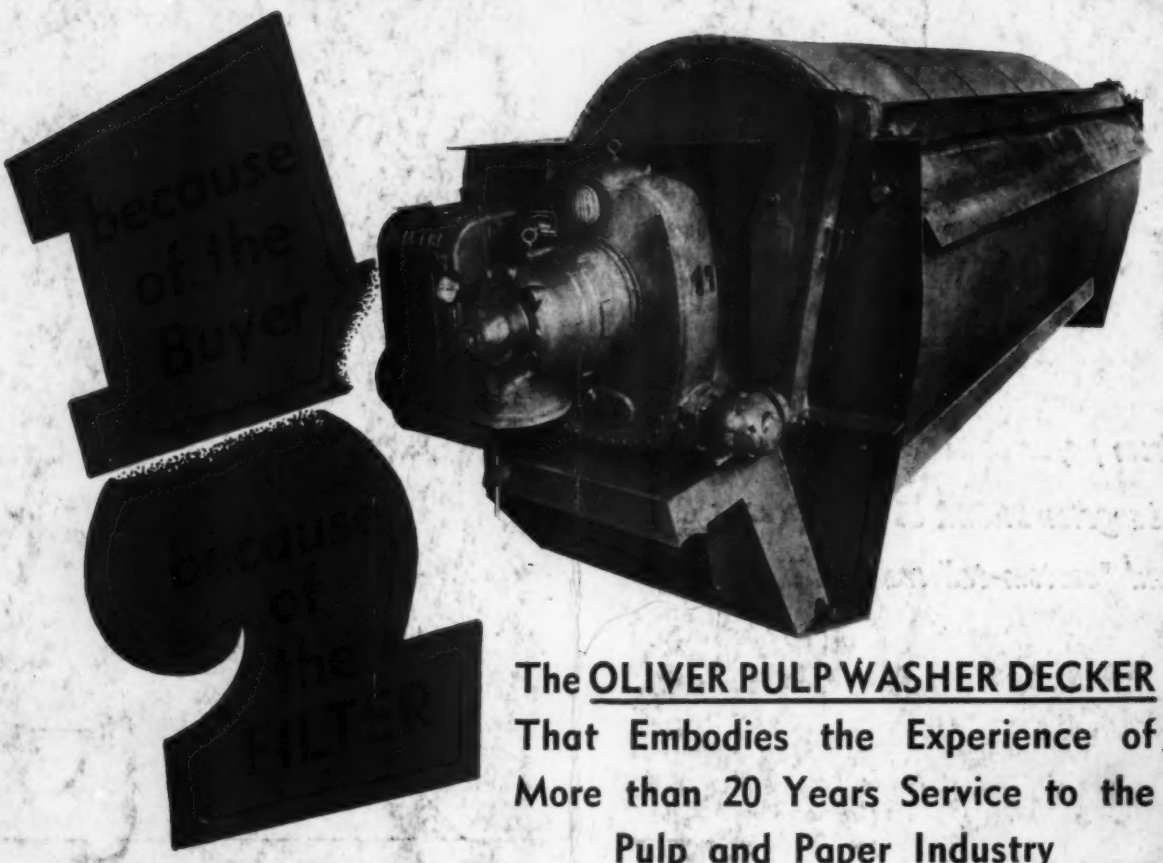

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